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REMARKS ON THE MERCANTILE ASPECTS OF THE BUSINESS OF PHARMACY—ELICITED BY A QUERY PROPOSED FOR THE PHARMACEUTICAL MEETING.

By William B. Thompson.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

Every individual affected by the conditions, which at present disturb the trade interests of the Apothecary, has been compelled, it may be said, to seriously consider the effect, and to form some conclusions from the causes. There are those who seem willing to abide the slower processes of time, and circumstances to produce favorable change, but such are regarded as anti-progressive, whilst he who can, or believes that he can, by some reasonable and practical method, arrest the result, by thwarting, or checking the operations of that cause, is the man for the emergency.

One whose business life has extended over the average experience has certainly been afforded opportunity to acquire business wisdom. It is not uncommon, however, to observe instances of management marked by the absence of the simplest precepts of mercantile rule, and unfortunately for the credit and the welfare of our craft these instances are to be found largely in the establishments of the Apothecary's.

The present general condition is not, however, the result, so much of individual omission as it is that of other circumstances which may be considered. There was a better day than the present for the trade of the Apothecary. This was before the era of ranks overcrowded and of relentless competitive struggle. It was a day

of better instincts in trade methods and of a more liberal exercise of mercantile honor. The tradesman, then, in protecting the honor of his confrère, sustained the moral of his trade and shielded his own honor. There was no written compact or agreement, but there was a sort of moral law which was scrupulously kept and upheld. As a consequence the interests of trade were then better protected and a spirit of the corps pervaded all. Now, the rougher experience is marked by an entire absence of these advantages and the time-honored maxim of "live and let live" is echoed back by selfish demand of let me live, only.

As a merchant of a former day the Apothecary maintained his vocation with respect. He gave no heed to arts which characterize the methods of his competitors of to-day, his business era stood in no need of it. The illumined bottles of his window, a traditional insignia of his craft, were the only advertising aid to which he resorted. There was but little disposition to question his terms or prices, his integrity of dealing was undoubted, and when the value of his service was to be demanded the science of his business stood foremost in the consideration. So far as the arts of trade were requisites for success he had not need for such resort, and he could securely repose upon the accredited value and dignity of his pursuit rather than risk its debasement by any questionable method.

But we live in a day, and time wholly different, a vast change having been wrought in these later years in the quiet precincts of the older Apothecary's shop. The growth of trade, with its ceaseless effort and widely extended competition, has left the old landmark far back in the dim past, and obscure though it may be to some of us, and antiquated withal, yet there lingers around and about it a halo of reverential and respectful memory.

If the query proposed simply seeks to learn whether the Apothecary needs a better mercantile education, the answer must be equally simple, and in the affirmative, but if the inquiry be extended so far as to include the methods of that education requisite to meet the needs of the present time then the scope of reply is made more comprehensive.

On one point we may readily agree, and it is this. That there certainly never before existed, in our experience, a period, in the history of the trade, in which the elements of difficulty, and discord, or in which a demoralized condition so widely extends as at present. It

is to seek some solution of this, or to wisely apply some remedy to the evil, that our efforts must be directed—we can hardly hope to enter the arena, and by one stroke summarily remove the cause—those who are wedded to fixed ways, however erroneous, are not to be at once diverted, nor can hope to successfully remonstrate, but we can meet the coming Apothecary upon the threshold of his business career, and indicate the way to a wiser course of procedure.

Those of us here who are more closely associated with the Apothecary in the character of apprentice or novitiate, can readily perceive from observation what advantage would naturally accrue to him in starting upon a career of business, to possess a liberal mercantile training, especially such as would enable him to meet the requirements set before him. Our recruit for pharmaceutical rank, we know, comes mainly from the middle class of society, here the necessity for a maintenance calls him early into the field of labor, and even a full opportunity to acquire a knowledge of his chosen pursuit is cut short. This alone would be greatly to his detriment, but in the time allotted until his majority is reached there is really no period in his career when he can prepare himself specially, in mercantile education. This must be acquired if at all by dint of his own exertion, under the appreciation of its necessity, as an essential part of his general training, but time and opportunity being both lacking he essays duties and tasks unprepared. It is true, he learns to buy, and sell, and observe the simple methods of such procedure, but he scarcely estimates the importance of applying judgment and observation to his practice. In his own sphere of transactions, although often small by comparison, it is possible for him to add to his knowledge the rules of business which lead to pecuniary reward, and to study those maxims which underlie the structure of a successful pursuit. But if we are asked to select a type of a class, which more largely than any other fails to apply the wisdom of method, and experience to the demands of a business vocation, we should point to the Apothecary.

The fact may be admitted that the dual character of the Apothecary's business has much to do with the complications of his position, and as pharmacists honoring as we should the dignified character of that calling as a profession, we must deprecate, most grievously, the close commingling of the commercial with the scientific aspects of the vocation. The former has borne the latter down, until our

pride is humbled, and the boast of a science in pharmacy seems but empty and idle, when we view the companionship which it is compelled to keep with commerce. Such result may be the inevitable consequence of the conditions which environ, and the spirit of the age, and there may be no help, or hope of extrication; but are there not some strong enough in influential example and voice to change this seeming fate, and call back to its old landmarks the *science* of pharmacy? Are there none courageous enough in the higher instincts embraced in the profession to draw a line of demarcation between the mere commerce in drugs, and their humane and beneficent application?

THE DETERMINATION OF MELTING POINTS.

By George M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

In a paper read before the American Pharmaceutical Association in 1886, Henry C. C. Maisch gives a review of most of the methods recommended for taking melting points (see American Journal of Pharmacy, 1886, page 486). Since then, several notes upon methods and various devices of apparatus have appeared in the pharmaceutical and chemical journals. Recently D. B. Dott in a paper before the British Pharmaceutical Conference (see Pharmaceutical Journal and Trans., Nov., 29, 1890, page 476) recommends taking of melting points in a small air bath, specially made for the purpose, constructed of copper, with a glass front and back. There is only one opening, that in the top for the introduction of the cork which holds the thermometer. Two brass wires, passing through the sides of the bath, support a piece of sheet asbestos. The substance whose melting point it is desired to determine is placed in a thin glass tube attached to the thermometer bulb, and the couple then placed in position well above the asbestos. The temperature is then very gradually raised and the melting of the substance is easily observed through the glass front of the bath. The results obtained, are stated to be very nearly correct and the method is especially recommended for substances having high melting points.

The plan adopted by the writer, while somewhat similar to the above, varies in several essential features. A tall plain beaker is used as an air bath. A crystallizing beaker with ground edge is

the best. This is covered with a circular piece of glass somewhat larger in diameter than the beaker. In the centre of this disk is drilled a hole about ¾ to 1 inch in diameter, to which is fitted a perforated cork for carrying the thermometer. Glass can be easily drilled with an ordinary steel drill, by using a solution of camphor in turpentine as a lubricant. The material to be examined is placed in a small glass tube, the lower end of which is drawn out, and is tied by means of thread to the thermometer bulk. The fine end of the tube should be cut or ground off at an angle of about 45°. The lower end of the small tube should not extend below the bulb of the thermometer. The height of the thermometer should be regulated so as to bring the bulb about the centre of the beaker. The heat is applied, the temperature being allowed to rise slowly, by means of a sand bath or by setting the beaker on an iron plate heated by the flame.

No one method will answer for all substances. This plan gives very uniform, and, I believe, correct figures.

It possesses several advantages, namely, being entirely of glass there is no unequal absorption of heat by certain parts; there is an entire absence of currents of air, and there is an unobstructed view of all sides of the tube so that observations as to change of color, shrivelling of the mass, charring, etc., which are especially desirable in certain organic bodies, as for example, alkaloids, can be easily made. There are no vapors as in a water bath, paraffin or acid bath to affect the compound and the vision of the observer.

SOLUTION OF SUCCINATE OF IRON.

By F. W. Haussmann, Ph. G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

No standard formula appears to have been proposed for a solution of the above iron salt, as a search made in a number of standard works of pharmaceutical literature failed to reveal any treatise on the subject.

The salt itself, viewed from a therapeutical standpoint, appears to have no place in our materia medica. Due to its insolubility in water, chemists sometimes take advantage of its formation in the quantitive estimation of iron.

Insoluble succinates are all more or less soluble in the presence of acetates and this fact may be utilized in the preparation of an

iron solution. Succinate of iron dissolves in a strong solution of potassium acetate with a deep red color, but the resulting liquid is unstable on account of the gradual formation of oxy-acetate of iron, which is precipitated. This change may be prevented by the addition of glycerin.

The main objection, however, in preparing a solution by this method is more on therapeutical than pharmaceutical grounds, namely, the excessive amount of potassium acetate required.

Most insoluble iron salts dissolve in the presence of citrates, and this is also the case with the succinate. By employing either sodium or potassium citrate, solutions of both ferrous and ferric succinate may be prepared. To prevent confusion the respective solutions are described separately.

Solution Ferric Succinate.—Attempted saturation of succinic acid by ferric hydrate has a negative result, ferric succinate, as already mentioned, being entirely insoluble in water. If the saturation is, however, made in the presence of citrates, combination readily takes place.

The following yields a stable solution:

Succinic acid,	64 grs.
Hydrated oxide of iron a sufficient quantity.	
Glycerin,	℥ss.
Potassium citrate,	℥iv.
Water sufficient to make	4 oz.

Dissolve the citrate in the glycerin with the aid of heat, add the oxide in small portions, alternately, with a little water, stirring well after each addition. Finally, add enough water to make 4 oz., boil for about 10 minutes, allow to cool and filter. Theoretically, about 40 grs. of $Fe_2(OH)_6$ are required, but when the solution was prepared, the amount was found to be insufficient. It is best, if the acid is boiled with an excess of the iron and allowed to settle before filtration. The solution contains about 2·5 grains ferric succinate in one fluid dram. It is of a deep ruby color, ferruginous taste, acid reaction, miscible with water in all proportions, and not affected by dilute acids, but turned deep red by ammonia; sp. gr. 1·110.

The commercial salt is also rendered soluble in the presence of citrates and the solution may be directly prepared from the same. The following method yields a solution, which differs considerably in appearance from the one prepared by the foregoing method:

Succinate of iron,	80 grs.
Potassium citrate,	6 drams.
Glycerin,	½ oz.
Water sufficient to make	4 oz.

Dissolve the citrate in the glycerin with heat, add the iron salt in small portions with the required amount of water. Boil, cool and filter. The resulting solution is of a yellowish green color, resembling the elixir of quinine, iron and strychnine very much, of a ferruginous taste and acid reaction. It is miscible with water in all proportions.

The iron salt employed was prepared by precipitating solution of iron tersulphate, diluted, with a solution of sodium succinate. The salt is of a deep red color very much like $Fe_2(OH)_6$, without odor or taste. Both solutions have on 3 weeks' standing not shown any change in appearance.

Solution of Ferrous Succinate.—If succinic acid is saturated either with freshly precipitated ferrous carbonate or the saccharated carbonate and filtered, a reddish liquid is obtained of a decided acid taste and reaction. It is stable, but contains only a slight amount of the salt, insufficient to have any therapeutic value.

On the salicylate of iron solution, as proposed in Remington's Pharmacy, an attempt was made to prepare one of succinate of iron, as follows, acetate of sodium being employed to stay decomposition:

Formula:

Ferrous sulphate cryst.,	24 grs.
Sodium acetate,	20 grs.

Dissolve in ½ ounce of water and mix with a solution of sodium succinate 32 grains in ½ ounce of water.

This mixture rapidly oxidizes, precipitating ferric succinate. It may be somewhat retarded, but not prevented by an addition of glycerin. As in the case of the ferric solution, combination of the acid and iron salt takes place in the presence of potassium citrate, if saturation is made with ferrous carbonate.

Either the freshly precipitated or the saccharated ferrous carbonate may be employed. The following process, while it requires some time for completion, is perhaps the most satisfactory for preparing the ferrous solution.

Succinic acid,	55 grs.
Freshly ppted. ferrous carbonate,	54 grs.

or,

Ferri carb. saccharat.,	6 drams.
Glycerin,	½ ounce.
Potassium citrate,	2 drams.
Water,	q. s. ℥iv

The mode of operation is essentially the same as with the ferric solution. It should be allowed to stand about 12 hours before filtration. It is of a deep reddish brown color, miscible with water, of a sweetish, ferruginous taste and acid reaction; sp. gr. 1·160. It contains 2·5 grs. of the salt in one dram.

It is not the place of the pharmacist to dwell upon any possible therapeutical value of the salt or its solution, yet like all other iron compounds it may be worthy of a trial, which it apparently never received.

To the query: What is the *best* formula for making the solution? no positive answer can be given. The three methods described all yielded solutions, which so far have remained stable. If the solution is required to be ferrous, naturally the formula for the same should be used. For the ferric it must be said, that the solution prepared directly from the salt presents a more attractive appearance, but succinate of iron is seldom found in a retail pharmacy. If not obtainable, the other method may be satisfactorily employed. Perhaps a more positive answer can be given, on examining the solutions after allowing them to stand for some time, when any possible change may be noted. Which is the best formula, we are at present not able to say.

SOLANUM CAROLINENSE (*Linnê*).

By G. A. Krauss, Ph.G.

III. THE BERRIES.

Professor Dragendorff's scheme of plant analysis was used in the following investigation on the berries of Solanum carolinense, which had almost been completed, when a paper on the same subject appeared in the Amer. Jour. Pharm., 1891, p. 126.

In the first place, an analysis of the fresh and bruised berries was made. Petroleum ether and ether extracted small quantities of an ethereal and of fatty oil, the former having a rather suffocating odor.

Alcohol extracted the moisture, became hydrated, and so dis-

solved glucose and albumen, besides the alkaloid and acid, contained in the berries. In my analysis of the root and leaves, the fact is pointed out, that the alcoholic extract of both root and leaves dissolves almost entirely in water (AMER. JOUR. PHARM., 1890, p. 602; 1891, p. 65). I likewise suggested the presence of an organic acid combined with the alkaloid, which together, caused the solubility in water. The berries contained the largest percentage of alkaloid and acid, and their separation was accomplished with less difficulty than from the root or leaves.

250 grams of fresh and bruised berries were macerated for 8 days,

Solanic acid; from alcohol extract, aqueous solution acidified, agitated with ether; × 480 diameters.

in officinal alcohol, the tincture distilled in vacuo to recover the alcohol, and the residue taken up by water and filtered.

The aqueous solution, when made alkaline by ammonium hydrate, formed a crystalline precipitate, which was found to consist of phosphate of calcium. Now, it must be remembered that Mayer's reagent will not precipitate alkaloids in combination with organic acids. If Mayer's reagent be added to the aqueous solution of the alcoholic extract, but a mere cloudiness will be observed. On the other hand, decomposing the natural alkaloidal salt with dilute HCl or H_2SO_4 and then adding Mayer's reagent, will produce an abundant flocculent precipitate. To separate the organic acid, the

aqueous solution of the alcoholic extract is acidified and agitated with ether. On evaporating the ether, there will be found a mass of well-defined feathery crystals, soluble in alcohol and ether. The accompanying microscopical drawing will illustrate the appearance under an amplification of 480 diam.

After a number of experiments, I found the following process to answer best for the separation of the alkaloid: To the acidified alkaloidal extract add ammonium hydrate in excess and agitate with amylic alcohol, separate the amylic alcohol and agitate it with dilute HCl or H_2SO_4. The acid solution is evaporated over H_2SO_4. The alkaloid as hydrochloride or sulphate has the same properties as enumerated in my previous papers.

Another experiment was made with 50 gm. unbruised fresh berries to find out whether it is necessary for the extraction of the alkaloid to bruise the berries or not. After 8 days maceration in officinal alcohol, the tincture was tested for alkaloids in the way described above:

The weight of Mayer's precipitate from 50 gm. of bruised berries,	0·386 gm.
50 gm. unbruised berries,	0·305 gm.

It would seem justifiable to presume that bruising the fresh berries does not effect an increased yield.

Moisture present in fresh berries,	77·53 per cent.

The complete analysis was carried out with 25 gm. of dried berries:

Petroleum ether extract:

Volatile oil,	0·220	
Wax and fat,	7·160	
		7·380

Ether extract:

Soluble in dilute HCl (solanidine),	0·574	
Fat and resin,	1·214	
		1·788

Alcohol extract:

Solanic acid,	0·300	
Solanine,	0·796	
Resin,	0·592	
Glucose,	0·988	
Extractive,	4·244	
		6.920

Aqueous extract:

Mucilage,	4·138	
Dextrin,	2·880	
Glucose,	0·804	
Extractive and albuminous substances,	9·286	
		17·108
Sodium hydrate extract,		11·560
Hydrochloric acid extract,		4·432
Cellulose and incrusting matter,		43·044
Ash, largely phosphate of calcium,		6·552
Loss,		1·216
		100·000

These results differ from those obtained by Kahn (AMER. JOUR. PHARM., 1891, 127) in the amount of oil, largely of volatile oil. Two comparative analyses were made:

Solanidine (?); from ether extract, dissolved by dilute H_2SO_4; × 325 diameters.

		Per Cent.
(I) Petroleum ether extract,		7·380
Contains volatile oil,	0·22	
Ether extract,	1 788	
		9·168
(II) Directly extracted with ether,		9·800
Contains volatile oil,	0·26	

The ether extract contained an alkaloid which was soluble in dilute HCl. The microscopical drawing will illustrate the crystals under an amplification of 325 diam.

I have already referred to the presence of an alkaloid in the ethereal extract of the root and leaves, and now confirm my previous statement, after having been able to extract a small amount for experiments. The alkaloid is soluble in alcohol and ether. It is precipitated by iodine and by Mayer's solution. It does not reduce Fehling's solution, even after boiling with dilute acid. This alkaloid appears to be *solanidine.*

The alcoholic extract contains the organic acid and alkaloid previously referred to.

The weight of the alkaloidal precipitate with Mayer's reagent, expressed in percentage of dried fruit, is 1 per cent.

The following experiment will illustrate the identity of this alkaloid with solanine:

The alcoholic extract contained 0·988 per cent. glucose.

After boiling with dilute acid, an amount of glucose corresponding to 1·784 per cent. was found.

The polariscope failed to indicate the presence of any saccharose. It, therefore, can be explained, that the alkaloid (solanine), acted on by dilute acid, was split up into glucose and *solanidine;* this glucose causing the increase in weight of Cu_2O.

The aqueous extract contains a considerable amount of albumen. It may be stated here that the solution after two days' standing contained innumerable quantities of Bacterium termo, the size of which was found to be considerably larger than ever noticed in solutions of animal albumen. Such vegetable liquids afford splendid opportunities for the study of these organisms, causing what is known as putrefaction.

The hydrochloric acid solution contained no starch and nothing reducible by Fehling's solution. Iodine caused a brown precipitate, and $HgCl_2$ a white flocculent precipitate. The cellulose and incrusting matter amounted to 43·044 per cent. Kahn's 15 per cent. of cellulose must have been obtained under different circumstances.

Summarizing the results now obtained by me, it will be fair to state, that all parts of Solanum carolinense, from root to fruit, contain the alkaloid *solanine* and probably also *solanidine,* combined with an organic acid, which seems to be new, in which case it should be called *solanic acid.*

The chemical results show that from the physiological point of view, the horse nettle might well have been expected to act favor-

ably as a remedy in epilepsy, since solanine has been recommended for alike diseases as far back as 1854. Dr. T. Otto (U. S. Dispensatory 16 edit., p. 516) found that 1 grain of solanine killed a rabbit in 6 hours.

Judging by this statement, it is not to be wondered to hear of reports of cattle feeding on the horse nettle leaves or berries being poisoned.

LABORATORY, MANSFIELD DRUG CO.,
MEMPHIS, TENN., April 16, 1891.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, Ph.G.

Safran Algeri (*extra*).—Under this name has appeared from a French source a substitute for saffron. It is an orange yellow powder of faint saffron odor, soluble in water, producing a solution identical in color with one made from pure saffron; under the microscope small quantities of powdered saffron can be recognized. A careful examination proved this substitute to be a mixture of Martius-yellow (dinitro-naphthol), and tropæolin 000 N.2, with a small quantity of saffron. The following method will serve for the isolation of the foreign coloring matters: To the filtered aqueous solution are added some woollen fibres; these are removed and replaced by others until no more color is extracted; the dyed fibres are washed with cold water and then warmed with ammoniacal water until the coloring matter has gone into solution; after filtering, the solution is boiled until free from ammonia and acidified with hydrochloric acid (if the solution be sufficiently concentrated a yellowish-white precipitate of dinitro-naphthol is here produced), after cooling, agitation with ether will remove the dinitro-naphthol; the aqueous solution of a red color, neutralized with ammonia and evaporated to dryness, will give on addition of sulphuric acid a bright-red color, and, upon dilution with water, a yellow solution (tropæolin).—Dr. G. Possetto, *Ztschr. f. Nahrungsm.-Unters. u. Hyg.* 1891, 45.

Empyreumatic substances in acetic acid may be removed by adding 3 per cent. manganese dioxide (or a manganate or permanganate) with the calculated quantity of sulphuric acid, allowing to stand 12 to 18 hours, then warming moderately until evolution of gas ceases

and distilling. This method is recommended as one of the stages in the purification of pyroligneous acid; the first tenth and the last twentieth only have a slight color and empyreumatic odor; the intermediate portions are free from color and foreign odor.—A. Kibitz, *Pharm. Post*, 1891, 253.

Analytical weights are recommended by A. Gawalowski to be made of the following alloy: Aluminum 80 parts, gold 8 parts, silver 2·5 parts and platinum 4 parts. This alloy has a specific gravity of 5·0, which will allow of all the weights, even the 0·5 milligram and the riders to be made of the same material. The weights are not altered in the laboratory atmosphere, they take a high polish and (the gram weights) are about twice the size of the brass weights. He also recommends the weights to be made of such shape as to do away with sharp edges and corners, so that they may easily be kept clean.—*Rundschau*, 1891, 189.

Constituents of Star-anise. The determinations of volatile oil, fixed oil and ash gave the following percentage figures:

	Volatile Oil.	Fixed Oil.	Ash.
Carpels,	6·11 5·20	1·13 1·47	2·81
Seeds,	3·00 2·40	22·9 21·7	2·46

The volatile oil consists chiefly of anethol $C_6H_4(OCH_3)C_3H_5$; with small quantities of terpenes, safrol $C_6H_3(O_2CH_2)C_3H_5$, the monoethyl ether of hydroquinone $C_6H_4(OH)OC_2H_5$, anisic acid $C_6H_4(OCH_3)COOH$, and a complex aromatic substance yielding upon oxidation veratric acid and piperonal. The fixed oil contains the usual constituents along with cholesterin and derivatives of phosphoric acid. In the aqueous extract is found protocatechuic acid and shikiminic acid $C_7H_{10}O_5$, which by nascent hydrogen iodide is converted into benzoic acid. Sugar was not found in any appreciable quantity, the sweet taste of the fruit, therefore, depending upon the volatile oil. Nitrogenous bases could not be detected.—F. Ostwald, *Arch. der Pharm.*, 1891, 84–115.

The tannin of Algarobilla (the fruit of Cæsalpinia brevifolia, *Benth.*) is a mixture of two tannins; one of which (present to the extent of 8–10 per cent.) is the glucoside of gallic acid, yielding upon hydrolysis gallic acid and sugar (dextrose); the other tannin present in much larger quantity is a tannic acid proper of the formula $C_{14}H_{10}O_{10}$, which at 100° C. easily loses two molecules of

water. The anhydrous acid $C_{14}H_6O_8$ is called ellagic acid (the formula of which is generally given $C_{14}H_8O_9$); the hydrated acid $C_{14}H_{10}O_{10}$ is called ellaggenic acid; the latter forms a penta-acetyl derivative, the former a tetra-acetyl derivative, indicating five and four hydroxyl groups, respectively, in the acids. In the fruit there also pre-exist small quantities of gallic and oxalic acids.

The tannin of Myrobalans is also a mixture of the two tannins mentioned above, although in somewhat different proportions; gallic acid in small quantity is also present. The tannins, were separated by fractional precipitation with lead acetate, subsequently purified by precipitation with sodium chloride and solution in acetic ether.—G. Zoelfell, *Arch. der Pharm.*, 1891, 123–160.

Musk.—Th. Wimmel publishes the results of a recent examination of a sample of musk which contained about 25 per cent. foreign vegetable matter, chiefly starch, and lost by drying in a water bath, 51 per cent. moisture; the ash amounted to only 2·5 per cent.—Apoth. Ztg. 1891, 154.

Assay of mercurial ointment.—A moderately wide test tube is filled to within one inch from the mouth with either of the solutions: Sodium nitrate 1· and water 2·5, or magnesium sulphate 1 and water 2; these solutions must be exactly neutral. From 4–6 gms. of the ointment are next placed in the test tube and this then put in a water bath until the fat melts and forms a clear layer above the aqueous solution; the solution having a higher specific gravity than the ointment the latter will float and in melting the mercury sinks to the bottom of the tube. After the fat becomes clear a small stick is suspended in the fat and the test tube set aside until the contents become cold; by gently warming the part of the test tube containing the fat the latter can be withdrawn from the test tube, and after the removal of the stick, weighed. By the appearance of the fat some idea of its nature may be obtained. The mercury, after pouring off the saline solution, is washed several times with water, dried by putting it in crumpled filtering paper and weighed. If the mercury used was not pure the weight obtained will be deficient, as the contaminating metals will gradually unite with the fatty acids and, hence, be found in the fat. The saline solution used must not contain even traces of alkali as this would cause saponification and prevent the fat from separating out perfectly.—C. Thein, Apoth. Ztg., 1891, 172.

Ash of Kamala.—Carefully selected kamala, according to P. Siedler, will not contain more than 1·5 per cent. ash; imported kamala yields from 21·8 to 49·1 per cent. ash. By sifting, fractions are obtained containing as high as 25 per cent., and as low as 5·2 per cent. ash; high percentage of mineral matter is generally due to the method of collection, although it may be due to adulteration; the percentage of ash has notably increased in the last few years, as by sifting it is very often impossible to get the drug containing less than 14 per cent. ash. Of 45 samples examined only 3 contained less than 6 per cent.; 11 contained between 8 and 10 per cent.; the remainder contained between 10 and 83·21 per cent. ash.—*Pharm. Ztg.*, 1891, 162.

Bettendorf's reagent for arsenic.—A method for preparing this reagent, so that it can be relied upon, is to dissolve one part crystallized stannous chloride in two parts concentrated hydrochloric acid (sp. gr., 1·19–1·20); the solution is colorless, refractive and fumes strongly in the air. It can be used in the examination of all chemicals excepting the orange sulphide of antimony; to use it one gram or one cc. of the article to be tested is dissolved in 5 cc. of the reagent, a brown precipitate or coloration within 15 minutes indicates the presence of arsenic; only in two cases is it of importance to apply the test in the cold, in bismuth subnitrate and solution of ferric chloride; in all other tests, heating to the boiling point will bring about immediate reduction of the arsenic impurity to the metallic condition producing the brown color or precipitate.—Dr. H. Warnecke, *Pharm. Ztg.*, 1891, 167.

Tests of purity for phenacetine.—(1) If 2·5 gm. chloral hydrate placed in a small test tube be melted by immersing in a water bath and 0·5 gm. phenacetine added a colorless solution will result upon agitation, providing the phenacetine be pure; keeping the test tube in the water bath for 5 minutes produces no change, but longer heating (15–30 minutes) will produce a rose color. In carrying out this test it was noticed that some specimens of phenacetine gave on heating for 2–3 minutes an intense violet coloration; this was found to be due to contamination with *p*-phenetidine one of the intermediate products in the manufacture of phenacetine. Fractions of a milligram will give a very distinct coloration. As *p*-phenetidine is poisonous, producing in continued small doses serious kidney troubles, this impurity may explain the bad effects obtained in some cases with phenacetine.

(2) A dilute iodine solution is made by adding 3 drops tincture of iodine and a little potassium iodide to 200 cc. water. This reagent will also detect *p*-phenetidine, although it is not as delicate as the test above. If 0·5 gm. phenacetine be briskly agitated with 5 cc. of the reagent and filtered the filtrate will have a red color if the phenacetine contains the above-mentioned impurity. F. Goldmann modifies the last test (Reuter's) by dissolving the phenacetine in 2 cc. alcohol and warming after the addition of the iodine solution.—*Pharm. Ztg.*, 1891, 185, 192, 208.

Atomic weights.—Recent determinations of chromium, by C. Meinecke, give as a mean 51·94. K. Seubert, in his determinations of the platinum metals, finds Ruthenium, 101·4; Rhodium, 102 7; Palladium, 106·35; Silver, 107·66; Osmium, 190·3; Iridium, 192·5 Platinum, 194·3; Gold, 196·7; Krüss and Moradt find for Beryllium, 9·027.—(*Lieb. Ann. Chem.*) *Chem. Rpt.*, 1891, 65 and 77.

The manufacture of hydrobromic acid from potassium bromide and sulphuric acid can be successfully carried out as follows: 100 gm. coarsely powdered potassium bromide, and 150 cc. sulphuric acid, sp. gr. 1·41, are moderately warmed until solution is effected and then distilled. Boiling commences at 126–127° C., the temperature slowly rising to 150° C. During this time most of the hydrobromic acid distils over, by heating to 250° C. very little additional HBr is obtained. Traces of sulphuric acid are carried over in the last portions; if the bromide used contain bromate, the first portions of the distillate will contain bromine, and in the rectification of the acid, the bromine is acted upon by careful addition of sodium sulphite solution until the acid is colorless before the distillation. The first portion passing over is a dilute acid, later at 126°, an acid of sp. gr. 1·49 and containing 48 per cent. HBr distils over. Only about 1 per cent. potassium bromide escapes decomposition, and if the bromide be pure no free bromine is found in the distillate.—W. Feit and K. Kubierschky, *Chem. Ztg.*, 1891, 444.

Salicylic acid lotion.—25·0 salicylic acid, 50·0 glycerin, 925·0 dilute alcohol (68 per cent.) 5 drops oil of gaultheria and one drop each of the oils of rose and orange-flowers; dissolve and filter. This is used in the cure of dandruff, the directions are as follows: Cleanse the scalp with warm soap-water, rinse with warm water, and dry with a towel. Put two tablespoonfuls of the lotion in a wine glass, fill with warm water and apply with a sponge; after removing excessive liquid, cover the scalp for ½ hour with a cloth.—E. Dieterich, *Pharm. Centralhalle*, 1891, 147.

NOTE ON PHLOX CAROLINA.[1]

By Henry G. Greenish, F.I.C.

Inquiring a few weeks ago at one of our wholesale houses for Spigelia root, I was informed that it was scarce just then, and all that they had in their possession was a broker's sample of about 4 ounces, to which I was welcome if it would be of use to me. An examination of this sample, which I accepted, disclosed points of interest that I venture to bring under your notice this evening.

On glancing at this so-called spigelia it was at once observed that for spigelia it was a bold sample. Closer inspection showed that it differed materially in its straighter, thicker and less wiry rootlets and smoother rhizome, from which the cup-shaped scars that characterize true spigelia are absent, the lower portions of the aërial stems frequently remaining still attached. Moreover, the cortex of the root showed a decided disposition to separate from the woody column, leaving the latter as a continuous yellow thread.

These characters led me to suspect that I was dealing with *Phlox carolina*, the root of which has been substituted for that of *Spigelia marilandica* in the United States. In 1883 Professor Maisch alluded to "the fact that the spigelia sold twenty-five years ago had entirely disappeared from the market, and its place had been taken by the much smaller roots of *Spigelia marilandica* and one or more species of *Phlox*, principally *Phlox carolina*."

In response to a request from me, Professor Maisch was kind enough to send me a sample, remarking that it was what he received some years ago as *Phlox carolina*.

This root agreed with mine, and on comparing them with herbarium specimens in the British Museum, which unfortunately were mostly without roots, I have little doubt that they are correctly named.

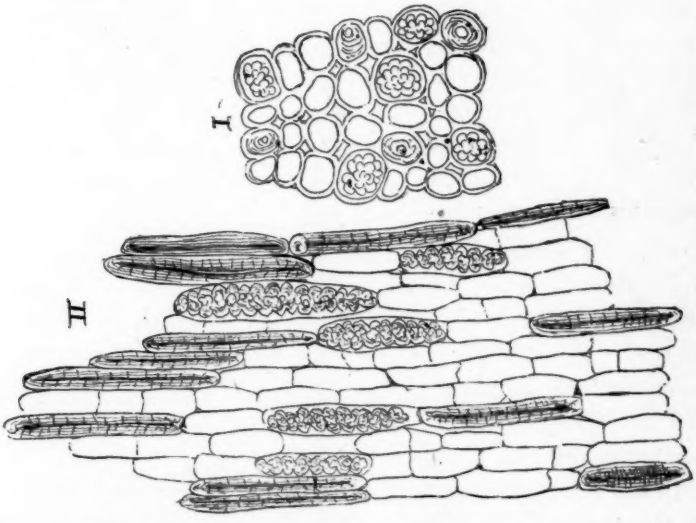
From the roots of this plant Professor Trimble isolated a red crystalline body, which he designated phloxol. This body passes into solution when the roots are digested with petroleum benzin, and thus furnishes us with another means of distinguishing phlox from spigelia.

But the most striking and interesting features of the root are those which are disclosed by a microscopical examination.

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, March 11th. From *Phar. Jour. and Trans.*, p. 839.

The transverse section of a light colored, well-developed root shows a small central woody column enclosed within an endodermis and surrounded by a comparatively large cortex. In the latter portion of the section the eye is at once arrested by numerous stone-cells, and also by the presence in a number of cells of an apparently granular mass more or less completely filling them. Here and there a small fragment of red coloring matter (phloxol?) is visible.

A tangential section shows the stone-cells to be of remarkable length. It also discloses the nature of the granular masses; they are large and well-formed cystoliths. These are usually more or less cylindrical in shape, not acutely pointed, as is sometimes the case.



On treating a section with dilute hydrochloric acid, the calcium carbonate, of which they are principally composed, dissolves with effervescence, leaving the cellulose skeleton undissolved. The presence of the stone-cells and cystoliths renders the section both characteristic and interesting.

Neither of them are confined to the root, but are to be found as well in the parenchymatous tissue of the rhizome and aërial stem. Here the cystolith, varying in shape with the cell which it occupies, is frequently nearly cubical, whilst the stone-cells assume approximately similar dimensions.

A few years ago cystoliths were thought to be confined almost

exclusively to plants belonging to the natural orders Urticaceæ, Cucurbitaceæ and Acanthaceæ. Last year Radlkofer enumerated eleven orders in which they had been found, but as far as I am aware they have not been previously observed in the Polemoniaceæ, to which order *Phlox* belongs. Nor are they often observed in the root, although it was in the root of *Rhinacanthus* that I found them some years ago, an observation which Professor Russow extended to other plants of the Acanthaceæ.

If, now, this sample of *Phlox* root be carefully examined, it will be observed that some roots appear light colored, whilst others are dark, both externally and internally, suggesting the possibility of the sample consisting of the mixed roots of two or more species of *Phlox*.

The histological characters of this dark root are, however, identical with those of the pale as far as structure is concerned, but the parenchymatous cells of the cortex are seen to be more or less completely filled with a red amorphous mass. If a tangential section of such a root is stained with sulphate of aniline, the red coloring matter is deepened, the stone-cells assume a straw-yellow tinge, whilst the cystoliths are unaffected.

On carefully examining the roots of my samples one by one, in search of an explanation of this difference, and separating the pale from the dark, I found a root which had, at some period or other of its growth, been injured; the cortex had been cut through, whilst the woody column remained intact. Above the injury the root was pale, below it nearly black; thus proving the identity of the dark root beyond doubt. Further search showed that every case of injury to the cortex was accompanied by the presence in the neighboring tissue of an abnormal amount of coloring matter, and several portions of root were found, which were dark at one end and pale at the other.

I content myself now with recording these facts, I purpose cultivating the plants, if possible, and may therefore perchance be able to furnish later on an explanation of what must be regarded now simply as an interesting fact.

A NEW ALKALOID IN TYLOPHORA ASTHMATICA.

By David Hooper.

Tylophora asthmatica is one of the better known Indian drugs among Europeans, on account of the leaves being made official

in the Pharmacopœia of India, and because a chapter is devoted to it in the "Pharmacographia" of Flückiger and Hanbury. The specific name of the plant points to its medicinal activity as being an important character, although other plants in the same natural order have somewhat similar properties. The older botanical names of the plant, *Asclepias vomitoria*, *Cynanchum vomitorium* and *C. Ipecacuanha*, refer more exactly to the physiological action of the drug, and as the action resembles so closely that of the true ipecacuanha of Brazil, it has been recommended in medical practice as a substitute in India, Mauritius, and other countries where it grows.

The leaves have been stated to be more certain and uniform in their action than the root, and a report on an examination of them occurs in "Pharmacographia" (2d ed., p. 427). "A concentrated infusion of the leaves has a slight acrid taste. It is abundantly precipitated by tannic acid, by neutral acetate of lead or caustic potash, and is turned greenish-black by perchloride of iron. Broughton, of Ootacamund, obtained from a large quantity of leaves a small amount of crystals, insufficient for analysis. Dissolved and injected into a small dog they occasioned purging and vomiting." I have been unable to discover any further particulars of Mr. Broughton's analysis among his note-books and reports, but an alkaloid I have recently found in the roots probably constituted the crystals obtained by him from the leaves.

The roots are pale brown, very brittle and about 6 inches or more in length by half a line in diameter. They have a sweetish taste, followed by acridity. The odor of the freshly-dried root is suggestive of old brown Windsor soap.

The alkaloid is dissolved out of the inspissated alcoholic extract with water, and the filtered solution, rendered alkaline with ammonia (which causes a precipitate of the base), yields it up to ether on agitation with that liquid. Its solution in ether and alcohol are alkaline in reaction, and it is only sparingly soluble in water in a free state. It forms neutral solutions with acids, and is precipitated by all the usual alkaloidal reagents. It is crystalline when evaporated from its more volatile solvents, and forms prismatic crystalline salts with hydrochloric and nitric acids. The pure alkaloid added to a few drops of sulphuric acid is dissolved with a reddish-brown color, which changes into a red, turning to green and

finally to an indigo tint. With nitric acid the alkaloid is colored purplish-red; that which dissolves is orange colored. Hydrochloric acid forms with it a yellowish solution. Frohde's reagent dissolves it with a sap-green coloration. Sulphuric acid and bichromate of potassium form a violet-brown fluid. A solution discharges the color of permanganate of potassium, but is not affected by ferric chloride and plumbic acetate.

These reactions are not to my knowledge peculiar to any of the known alkaloids. The purplish-red color with nitric acid is similar to that obtained with buxine and pereirine, but the absence of a strong bitterness, and the different purposes to which the respective mother plants are put, do not admit of a chemical relation between these bases.

I propose for this alkaloid the name of "tylophorine," and when opportunity affords I hope to be able to give some further particulars of its chemical constitution, and, with the assistance of a medical friend, of its physiological action. The occurrence of alkaloids in the natural order Asclepiadaceæ has not been recorded, or very rarely so, but I have recently found that they are by no means absent from this family of plants.—*Pharm. Jour. and Trans.*, Jan. 17, p. 617.

ALKALOIDS AND OTHER ACTIVE PRINCIPLES FROM PLANTS GROWING IN THE DUTCH INDIES.[1]

By M. Greshoff.

I. *Carpaïne, the Alkaloid of Carica Papaya*, L.—The leaves of the papaya (*Carica Papaya*, L.) contain, in addition to the caricine and papaine discovered by Wurtz and Peckolt, an alkaloid which has not previously been prepared, and for which the name *carpaïne* is proposed. The young leaves are richest in the alkaloid, and contain about 0·25 per cent.; the sap, seeds, and roots only contain traces. Carpaine is readily soluble in alcohol, chloroform, and ether, the freshly precipitated compound being more readily taken up by the latter solvent than when crystallized, a fact which is made use of in isolating the alkaloid. It is compleletely separated from solutions of its salts by sodium carbonate solution, but is insoluble in potash, and cannot be extracted from acid solution. It gives precipitates with Mayer's solution, iodine, phosphomolybdic acid,

[1] *Ber.* **23**, 3537—3550; reprinted from *Jour. Chem. Soc.*, 1891, p. 334.

picric acid, gold chloride, tannin, potassium, thiocyanate, etc., melts at 115°, and sublimes partly without decomposition. Its *hydrochloride* crystallizes in beautiful, lustrous needles, and is readily soluble in water. The base even when dissolved in 100,000 parts of water, has a bitter taste, and is only poisonous in large doses, but small quantities readily kill smaller animals, the action taking place on the heart.

II. *Investigation of Indian Leguminous Plants.*—The plant known as *Derris* (*Pongamia*) *elliptica*, Benth., is largely used in Java in fishing, and appears also to be a constituent of the Borneo arrow-poison. It has exceedingly poisonous action on fish, a decoction of the roots being fatal even when diluted with 300,000 parts of water. The only active constituent isolated is a resinous substance termed *derrid*, which does not contain nitrogen and is not a glucoside; it readily dissolves in alcohol, ether, chloroform, and amyl alcohol, but is very sparingly soluble in water and potash solution. On fusion with potash, it yields salicylic and protocatechuic acids. It occurs almost entirely in the cortex of the root, but has not yet been obtained pure. Its alcoholic solution has a slightly acid reaction, and a sharp aromatic taste, causing a partial insensibility of the tongue, which remains for hours. A solution of 1 part in 5 millions is almost instantly fatal to fish. A very similar compound is found in the seeds of *Pachyrhizus angulatus*, Rich., a decoction of which is quickly fatal in a dilution of 1 : 125,000. It is probably identical with derrid, but until this has been experimentally proved it may be distinguished as pachyrhizid. It is very readily prepared from *Pachyrhizus*, which occurs in all tropical countries, as the tannin compounds, usually so difficult to separate, are not found in this plant. The seeds also contain a non-poisonous, crystalline compound, which is readily soluble in alcohol, and has at 30° the consistence of butter.

The plant *Sophora tomentosa*, L., formerly renowned as a medicine ("*Anticholerica Rumphii*"), contains a poisonous alkaloid, soluble in ether, which is contained in largest quantity in the seeds. Alkaloids have previously been found in *S. speciosa* and *S. angustifolia*, but have not been closely investigated.

The cortex of *Erythrina* (*Stenotropis*) *Broteroi*, Hassk., contains considerable quantities of an alkaloid, which may be readily isolated by Stas' method, and is easily soluble in ether. Its sulphate may

be obtained in crystals from concentrated aqueous solution. It gives precipitates with many metallic salts and with the usual alkaloid reagents; it is a fairly strong poison, being fatal to fowls in doses of 0·025 gram. A poisonous alkaloid likewise exists in *Erythrina* (*Hypaphorus*) *subumbrans*, Hassk., and is best isolated as a metallic double compound.

The leaves of different kinds of cassia are employed in Java as a remedy for herpes; they contain a glucoside which yields chrysophanic acid as a product of hydrolysis.

The leaves of *Crotolaria retusa*, L., contain considerable quantities of indican; the seeds contain an alkaloid, which is found in larger quantities in the seeds and leaves of *C. striata*, L. The base is a strong poison, and is probably closely related to the known alkaloids of other Genisteæ, such as *Cytisus*, *Ulex*, *Spartium*, and *Lupinus*.

The seeds of *Millettia atropurpurea*, Benth., contain a poisonous glucoside, the chemical and toxicological properties of which closely resemble those of saponin. The plant is also employed for poisoning fish. The cortex of *Acacia tenerrima*, Jungh., contains a bitter poisonous alkaloid, readily soluble in ether and chloroform. No alkaloid has previously been found in an acacia. The leaves of *Albizzia saponaria*, Bl., contain cathartic acid, whilst the leaves and cortex contain saponin in quantity.

The cortex *Pithecolobium bigeminum*, Mart., contains 0 8 per cent. of a non-volatile, amorphous alkaloid, which forms crystalline salts, and separates as a heavy, yellow oil on the addition of alkalies to solutions of the latter. With 100 parts of water, it forms a turbid liquid, which on warming assumes the appearance of milk, but becomes clear on the addition of an acid. The solutions have a burning taste, and give the usual alkaloid reactions. It has a strong corrosive action on the skin, and is fatal to fish in a dilution of 1 : 400,000. The same compound appears also to occur in *P. saman*, Benth.

III. *Apocyneæ containing Alkaloids, occurring in the Dutch Indies.*—The leaves, cortex, and seeds of *Melodinus lævigatus*, Bl., also contain a poisonous alkaloid, which is present in the largest quantities in the seeds (0·8–1 0 per cent.). It is decomposed by dilute hydrochloric acid, but is not a glucoside, and gives the ordinary alkaloid reactions in very dilute solutions, and with feeble oxidizing agents

in sulphuric acid solutions gives a greenish coloration, which then becomes deep blue and finally orange.

Leuconotis eugenifolia, Dec., yields a poisonous, crystalline alkaloid which is readily soluble in ether, and shows the general reactions of the alkaloids, but gives no color reactions. The cortex of *Rauwolfia canescens*, W., yields an alkaloid which gives a beautiful, blood-red coloration with nitric acid. *Rauwolfia* (*Ophioxylon*) *serpentina* and *trifoliata*, which is highly prized in Java as a drug, also contains a crystalline alkaloid which gives the same reaction with nitric acid, and its presence may be easily recognized microscopically in the various parts of the plant by this reaction. The substance recently described as ophioxylin is identical with Dulong's plumbagin, the error being caused by a confusion between *Ophioxylon serpentinum*, L., and *Plumbago rosea*, L., which, though very different plants, are both termed "Poeleh Pandak" in Java. The above alkaloid also occurs in *Rauwolfia* (*Cyrtosiphonia*) *spectabilis* and *madurensis*. All these species of *Rauwolfia* contain a brown substance also; this likewise appears to be an alkaloid, and yields a beautiful, blue, fluorescent solution in ether. It is constituent of many *Apocyneæ*.

The cortex of *Hunteria corymbosa*, Roxb., contains 0·3 per cent. of a crystalline alkaloid, which also forms crystalline salts, and gives a beautiful violet coloration with Erdmann's and Fröhde's reagents. It is a strong poison, and has a sharp, burning taste, even when diluted to 1 : 10,000. The cortex of *Pseudochrosia glomerata*, Bl., also contains a poisonous, crystalline alkaloid, and the above fluorescent compound.

The cortices of *Ochrosia* (*Lactaria*) *acuminata*, *Ackeringæ*, and *coccinea* are rich in alkaloid constitutents. Three products have been isolated, namely, a colorless, crystalline alkaloid soluble in ether, which is moderately poisonous, an alkaloid insoluble in ether but soluble in amyl alcohol, which is the best isolated as the mercurochloride, and also the above-mentioned fluorescent compound. These substances also occur in the seed and the sap. The cortex of the stem of *Ochrosia* (*Bleekaria*) *kalocarpa* contains 1·2 per cent. of alkaloids.

The seeds of *Kopsia flavida*, Bl., contain no less than 1·85 per cent. of a homogeneous alkaloid, which is soluble in ether and readily prepared pure and crystalline; it likewise occurs in *Kopsia*

arborea, Bl., the leaves of which contain in addition a fluorescent substance. *Kopsia* (*Calpicarpum*) *Roxburghii* yields quite a different alkaloid, which causes tetanus. The seeds and leaves of *Kopsia* (*Calpicarpum*) *albiflorum* contain an alkaloid, as also do *Vinca rosea*, L., and *Alstoni* (*Blaberopus*) *villosa*.

Voacanga (*Orchipeda*) *fœtida* yields a bitter alkaloid readily soluble in ether, and the fluorescent compound already frequently mentioned. *Tabernæmontana sphærocarpa*, Bl., also contains an alkaloid, and a wax-like compound, which is free from nitrogen and melts at 185°. Alkaloids are also present in *Rhyncodia* (*Cercocoma*) *macrantha* and in *Chonemorpha macrophylla*, Don, which is of interest, inasmuch as these species both belong to the *Echitidiæ*, the other members of which are free from alkaloids.

IV. *Cerbera Odollam*, Hamilt.—The sap, leaves and cortex of this plant have no toxicological action, but the seed kernel contains, in addition to a non-poisonous fatty oil, the compound *cerberin*, which has a poisonous action on the heart. It resembles thevetin, thevetosin and tanghinin, but is identical with none of them. It most nearly resembles the last-named substance, which is obtained from *Tanghinia venenifera*, Poir., the "test-plant" of Madagascar. Cerberin is free from nitrogen and crystallizes well, and although decomposed by acids, is not a glucoside. It is insoluble in water, but dissolves readily in alcohol, chloroform, acetic acid, and 80 per cent. ether, and melts at 165°. It gives a violet coloration with sulphuric acid, has a sharp, burning but not bitter taste, and is very poisonous. The seeds contain another very poisonous substance, which is readily soluble in water, alcohol, and amyl alcohol, but insoluble in chloroform, for which the name odollin is proposed. It is not precipitated by lead acetate, and gives the same color reaction with sulphuric acid as cerberin.

V. *Laurotetanine, the Active Constituent of certain Lauraceæ.*—Many of the Javan varieties of Lauraceæ contain, in addition to other not yet clearly defined bases, a crystalline alkaloid termed *laurotetanine*, which has a strong tetanic action on animals. It is contained in quantity in the cortex of the stem of *Litsæa chrysocoma*, Bl., and is sparingly soluble in ether, more readily in chloroform. It is precipitated by sodium carbonate from solutions of its salts, but readily redissolves in an excess of potash or soda, and is precipitated by the usual alkaloid reagents. The freshly prepared alkaloid

commences to crystallize after some days in stellate groups of needles; it gives a dark indigo-blue coloration with Erdmann's reagent, a pale rose-red with pure sulphuric acid, and a reddish-brown with nitric acid. A base which seems to be identical with laurotetanine is also found in the varieties of *Tetranthera*, in *Notaphœbe*, Bl.. *Aperula*, Bl., and *Actinodaphne*, Nees. It is possible, also, that laurotetanine is identical with the alkaloid discovered in 1886 by Eykmann in *Haasia squarrosa*, Z. et M., as the author has also found it in *H. firma*, Bl.

Hernandia sonora, L., and *H. ovigera*, L., both yield an alkaloid closely resembling the bebeerine obtained from *Nectandra*, whilst *Illigera pulchra*, Bl., contains laurotetanine.

VI. *The Distribution of Hydrocyanic Acid in the Vegetable Kingdom.*—The leaves of *Gymnema latifolium*, Wall., an Indian *Asclepiadea* contain large quantities of amygdalin, which can, however, only be obtained in the amorphous condition. The leaves do not contain any enzyme, and may, therefore, be distilled with water or dilute sulphuric acid without any hydrocyanic acid or benzaldehyde passing over. On the addition of emulsin, hydrolysis readily takes place.

The fresh bark of many Javan forest trees gives off an odor of bitter almond oil. It was found that *Pygium parviflorum*, T. et B., and *P. latifolium*, Miq., both contain amygdalin, which on botanical grounds was not improbable, as the species *Pygium* is closely related to *Amygdalus*.

When the fruit of certain Javan Aroides (the genera *Lasia* and *Cyrtosperma*) is cut, a strong odor of hydrocyanic acid is observed, and it was found on investigation that it is present in the free state. It also occurs in the leaves of these plant. It is found, however, in much larger quantity in a Javan tree known as *Pangium edule*, Reinw., the seeds of which, after cooking in a certain manner, are looked on by the Malays as a valuable food. If this cooking is insufficient, the seeds are a frightful poison, and are used in Javan for killing fish and insects. It was found on investigation that all parts of the tree contain free hydrocyanic acid. Thus the leaves, on distillation, yielded 0·34 per cent. which is equal to 1 per cent. on the dried leaves; in the other parts the proportion, although less, is still considerable. The amount of hydrocyanic acid is not constant, old *Pangium* leaves having been examined which only contained 0·045 per cent.

The leaves and seeds of the *Pangium* contain a substance which reduces ammoniacal silver solution and Fehling's solution in the cold, and whose solutions become dark-colored in the air. Although no crystalline compound could be obtained with phenylhydrazine, it is probably a sugar, with which the hydrocyanic acid forms an unstable compound. The seeds, which are originally white, gradually become dark, the hydrocyanic acid disappearing at the same time.

The only poisonous constituent of the genus *Hydnocarpus* is also hydrocyanic acid. The fatty oils of certain species of *Hydnocarpus* are used externally in skin diseases, their value being possibly due to the antiseptic action of hydrocyanic acid.

ON THE CRYSTALLINE ALKALOID OF ACONITUM NAPELLUS.[1]

By Wyndham R. Dunstan and W. H. Ince, Ph.D.

From the Research Laboratory of the Pharmaceutical Society.

The authors have investigated the properties of a crystalline alkaloid obtained from the root of *Aconitum Napellus* by extraction with amyl alcohol, as suggested by the late Mr. John Williams (*Pharm. Journ.* [3] xviii, 238). For a supply of the material they are indebted to the kindness of Messrs. Howards & Sons, of Stratford.

The yellowish indistinct crystals melted at 188·4° (corr.) and by crystallization from alcoholic solution were proved to be associated with a small quantity of a gummy amorphous base. On combustion the original substance gave numbers agreeing fairly well with the formula $C_{33}H_{43}NO_{12}$ which is that proposed for aconitine by Wright and Luff (*Journ. Chem. Soc.*, 1879). The alkaloid was purified by repeated crystallization from a mixture of alcohol and ether, or more readily by conversion into its hydrobromide and regeneration of the alkaloid from this salt or by regeneration from its crystalline aurochloride. It crystallizes in tabular prisms belonging to the rhombic system; the crystallography of the substance has formed the subject of a separate inquiry by Mr. Tutton. The crystals are very slightly soluble in water and light petroleum, more

[1] The substance of a communication made to the Chemical Society, March 19; reprinted from *Phar. Jour. and Trans.*, March 21, p. 857.

soluble in ether and alcohol, most soluble in benzene and chloroform. They melt at 188·5° (corr.). Contrary to the statements of previous observers, who found aconitine to be lævo-rotatory, the authors found an alcoholic solution to the *dextro-rotatory* $[\alpha]_D$ + 10·78°; the aqueous solution of the hydrobromide is, however, lævo-rotatory $[\alpha]_D$ — 30·47°. On analysis, the pure alkaloid afforded results which agreed best with the formula $C_{33}H_{45}NO_{12}$.

Two crystalline *aurochlorides* were obtained. One ($C_{33}H_{45}NO_{12}HAuCl_4$) melts at 135·5° (corr.); the other, a basic aurochloride ($C_{33}H_{45}NO_{12}AuCl_3$), melts at 129° (corr.). These compounds are obtained without difficulty, and afford trustworthy means of identifying aconitine. The alkaloid may be readily recovered from them in a pure state.

Aconitine is not appreciably affected by heating at a temperature below its melting point, but at this temperature it is gradually converted into the uncrystallizable base aconine. Prolonged boiling in aqueous solution induces a similar change, but not to the same extent, unless an alkali is present. Boiling with water acidulated with hydrochloric acid also produces decomposition of the alkaloid.

Dehydraconitine or *apoaconitine* is a base differing from aconitine by the absence of a molecular proportion of water, which was first obtained by Wright and Luff by acting on aconitine with acids. Its existence has, however, been questioned by later workers. The authors find that such a substance may be readily procured by heating aconitine with saturated aqueous tartaric acid in closed tubes, as recommended by Wright and Luff. The crystals of this substance melt at 186·5° (corr.). It forms crystalline salts, and in other respects closely resembles the parent alkaloid. The results of analyses agree well with the formula $C_{33}H_{43}NO_{11}$. Three *aurochlorides* were obtained. One ($C_{33}H_{43}NO_{11}HAuCl_4$) melts at 141° (corr.). This salt, when crystallized from aqueous alcohol, becomes a hydrate—

$$(C_{33}H_{43}NO_{11}HAuCl_4H_2O)$$

melting at 129° (corr.), isomeric with aconitine aurochloride, into which, indeed, it very readily changes. The third aurochloride is a direct compound of the alkaloid with auric chloride ($C_{33}H_{43}NO_{11}AuCl_3$); it melts at 147·5° (corr.).

An *amorphous base* was obtained from aconitine, together with benzoic acid, by prolonged heating with water in a closed tube. It

appears to be identical with the *aconine* of Wright and Luff. The same substance is formed together with a resinous substance when aconitine is heated with an alkali. Neither aconine nor its salts could be crystallized. The amorphous base, after purification, and its amorphous aurochloride, afforded analytical data agreeing respectively with the formulæ $C_{26}H_{41}NO_{11}$ and $C_{26}H_{41}NO_{11}HAuCl_4$.

A further study is being made of aconine and of the question as to the existence of other alkaloids in the root of *Aconitum Napellus.*

ECGONINE.[1]

By U. Mussi.

The author has already (*L'Orosi*, [11], 270–277) recommended that, since the direct detection of cocaine is difficult, the products of its decomposition should be sought for in toxicological investigations. With this object, he has examined the behavior of ecgonine with various reagents. Acccording to Einhorn this alkaloid is *methyltetrahydropyridyl-β-hydroxypropionic acid*,

$$C_5NH_7Me{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH,$$

and reacts both as a base and an acid; it crystallizes in colorless, lustrous, monoclinic prisms with 1 mol. H_2O, which is lost at 120–130°. It is very readily soluble in water, less easily in absolute alcohol, insoluble in ether, chloroform, and carbon bisulphide. Its solutions are neutral, and have a somewhat bitter taste. It melts at 198° with partial decomposition. With phosphomolybdic acid, it forms a yellow precipitate; with somewhat concentrated gold chloride solution, a yellow, amorphous precipitate; with platinic chloride in dilute alcoholic solution a red-brown, crystalline precipitate, $(C_9H_{15}NO_3)_2,H_2PtCl_6$, which is readily soluble in water, and loses hydrogen chloride when heated, forming the salt $(C_9H_{15}NO_3)_2PtCl_4$. With stannic chloride, mercuric chloride, tannin, and picric acid, it forms no precipitates which distinguish it from cocaine. Especially is the reaction with Wenzell's reagent (200 parts of sulphuric acid and 1 part of potassium permanganate) delicate, a clear wine-red coloration being formed which disappears only after some time.

In an experiment with a rabbit, 1·26 grams of ecgonine per kilo,

[1] *Chem. Centr.*, 1890, ii, 516–517; from *L'Orosi*, **13**, 152–158; reprinted from *Jour. Chem. Soc.*, 1891, p. 333.

of live weight was found to be fatal. After 48 hours, the entrails were divided into five parts, and each part digested several times at 60° with twice its weight of alcohol, and the extract concentrated nearly to dryness. The residue was taken up with water, and shaken several times with ether in order to extract fatty substances. The aqueous solution was precipitated with basic lead acetate, filtered, the lead removed as sulphide, the liquid again filtered, evaporated to dryness, and the residue finally extracted with a little absolute alcohol, in which the ecgonine exists as acetate and was readily detected. The alkaloid was found in the heart, blood, lungs. liver, brain and spinal cord.

Ecgonine Salts.—$(C_9H_{15}NO_3)_2Mg+3\frac{1}{2}H_2O$, very hygroscopic plates, soluble in water, and alcohol, insoluble in ether, melting at 190°. $(C_9H_{15}NO_3)_2Ca$ is soluble in water and alcohol, insoluble in ether. $C_9H_{15}NO_3Ag$, orange-colored, decomposing readily when exposed to the light. *Ecgonine acetate*, $C_9H_{15}NO_3,C_2H_4O_2+2\frac{1}{2}H_2O$, needle-like, hygroscopic crystals, melting at 196°, very soluble in water and alcohol, insoluble in ether.

MINUTES OF THE PHARMACEUTICAL MEETING.

APRIL 16, 1891.

The seventh of the present series was held this day; on motion of Mr. Wm. B. Webb, Mr. Wm. B. Thompson was called to the chair.

The minutes of the last meeting were read and no corrections being required they were approved.

The secretary read the formulas for *Goddard's astringent gargle*, placed in his hands by Wm. B. Webb and L. C. Funk, both are known to have been directed by the late Dr. Paul B. Goddard.

℞

Fol. rosæ rub.,	ʒii
Aquæ bullientis,	fʒv
Acidi sulphurici diluti,	fʒss

Infuse, when cold, strain and add:

Mel. despumati,	fʒj
Acidi tannici,	℈ii
Aluminis,	ʒij
Spts. vini rectif,	fʒvi
Aqua rosæ,	fʒvi

M.

The other formula contains pomegranate rind in place of tannin, but this is preferable.

℞

Red rose petals,	℥ ii
Pomegranate rind,	℥ iv
Boiling water,	f℥ vi

Infuse, strain and add:

Alum,	℥ ij
Clarified honey,	℥ j

Filter.

M.

Mr. Beringer exhibited specimens of cantharidin and cantharidate of potassium, Liebreich's new remedy for consumption, the dose being one- or two-tenths of a milligramme used hypodermically. The specimen of cantharidin was very fine both in color and in size of crystals. They were both from the laboratory of Dr. Theodore Schuchardt, of Goerlitz, Germany.

Mr. F. W. Haussmann, Ph.G., read a paper on solution of *succinate of iron*, which was referred to publication committee.

Mr. McIntyre in reply to the query, What is syrupus roborans? said that the name was that of a proprietary article, made by a house in Louisville, Ky. The formula was given in the Western Druggist. It seems that the best way to answer this query is to submit what may be termed a skeleton formula indicating the amount of quinine and strychnine that is really desired in each dose, and adding the hypophosphites of iron, calcium, sodium, potassium and manganese in such quantities as will, when combined form an advantageous preparation. Such a formula is the following:

Hypophosphite of	Calcium	two grains	
"	Sodium	one "	
"	Potassium	one "	
"	Iron	half "	
"	Manganese	half "	
"	Quinine	half "	
"	Strychnine	$\frac{1}{100}$ "	in every teaspoonful.

This will represent a syrup of quinine, strychnine and hypophosphites similar to Fellow's (or other good makes).

To obtain equally good results the following simple formula may be followed, the manganese being the only salt omitted.

Quinine bimuriatis,	Gr xxv
Strychnine sulphatis,	Gr ½
Aquæ destillatæ,	f℥ ij
Syrupi hypophosphitum cum ferro,	f℥ vj

M.

Owing to the great solubility of the bimuriate of quinine and sulphate of strychnine in water, an excellent opportunity is presented to the physician of altering the dose in any manner that circumstances may indicate.

A secret preparation is claimed to contain twenty-five per cent. of cod liver oil, and is called a tasteless preparation of cod liver oil and hypophosphites; the examination of it, by two capable chemists, published some two years ago, showed it to be destitute of any oil.

The recipe of the National Formulary does not seem to give a sufficient dose

of strychnine, and that of the British Pharmaceutical Conference was also thought too weak, that of Dohme was thought to be of good proportions. The question as to the possibility of making an *elixir of pepsin, bismuth and strychnine*, which would contain all the ingredients, was replied to that it was quite possible, as citric acid would dissolve the pepsin and if just neutralized with ammonia the bismuth could be kept in solution.

Mr. Beringer read a paper upon the *determination of melting points*, describing an apparatus which he had found quite useful for that purpose; the same gentleman also exhibited an *improved spritz bottle*, using an atomizer bulb for compressing the air, and a third tube which is kept closed, while the water is flowing and opened when it is desired to cause the flow to cease.

Mr. England replied to a query relative to Adonis vernalis, that he used Bubnow's formula, viz: four to eight parts of the whole herb to one hundred and eighty parts of water. Dose, a tablespoonful every two hours.

The subject of the *better commercial education of the apothecary*, was discussed in a paper from Mr. Wm. B. Thompson. Professor Remington thought that the business in proprietary medicines would be relegated to general stores and that pharmacies proper would ignore patents. Mr. McIntyre thought we would be wrong in signing any such contract as would reduce us to mere sub-agents of patent medicine men, while we might make some arrangements with manufacturers of such goods that would be advantageous.

Mr. Beringer thought that the Alumni Association might do a very good work by securing some one who would give one or two lectures upon this subject.

There being no further business, on motion adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The *junior examinations* were held November 8, December 6, and March 7, the questions being as follows:

BOTANY AND MATERIA MEDICA.

(1) Give a full description of the manner in which cells are multiplied by division, and by free cell formation.

(2) Give definitions of the following botanical terms: Root, primary root, secondary root; also give some examples of officinal roots consisting mainly of primary roots, and wholly of secondary roots.

(3) Give a description of the structure of a dicotyledonous stem, and name the kinds of cells contained in each tissue, mentioned in the description.

(4) Define the following, and give for each two examples of officinal drugs: Rhizome, bulb, leaf and leaflet.

(5) Name two officinal *gamopetalous flowers* from different orders, giving for each the botanical name, the natural order, the habitat of the plant, description of the flower, and the medicinally important constituents.

(6) Give the botanical name of *Irish Moss*, and the habitat of the plant; describe the drug. Explain the principal botanical differences between the *Algæ* and the *Lichenes*.

THEORY AND PRACTICE OF PHARMACY.

(1) Describe the Metric System? What are the units? Why is it called the Decimal System? What advantages does it possess over all other systems? If

a piece of aluminium weighs 256 Gm. and has the specific gravity of 2·56 and loses 82 Gm. when immersed in a liquid, what is the specific gravity of the liquid?

(2) Describe the principle of the use of Steam for heating in pharmaceutical operations. What is the difference between heating by steam with pressure and heating by steam without pressure? Describe the apparatus used in both methods?

(3) Define boiling point as applied to liquids. Upon what does the rapidity of evaporating *boiling liquids* depend? Upon what does the rapidity of evaporating liquids *below the boiling point* depend? Illustrate by a sketch.

(4) Define Distillation; Liebig's Condenser; Desiccation; Comminution; Filtration.

(5) Describe the differences in the appearance of crystallized, colloidal and scaled Salts. Give an unabbreviated officinal name for each kind of Salt and give a general method for preparing Scaled Salts.

(6) Name and describe three officinal substances obtained from the following metals: *Manganese*, *Chromium* and *Silver*, the properties of each substance being caustic and destructive to organic matter. Give the precautions necessary in compounding pills made from either of the Salts and state the best excipient for each.

CHEMISTRY.

(1) What is meant by Latent Heat? In what changes of condition is heat rendered latent? Give some examples of this, and state any application of these facts in practical use.

(2) What is the composition of White Light? How could you show this statement to be correct? What is a spectroscope, and for what purposes is it used by the Chemist?

(3) Define Equivalence as applied to Chemical Elements. How are Binary Molecules named? Give examples. Write the formulas of three officinal substances that are binary compounds.

(4) Write two chemical reactions for the production of chlorine. Describe some experiments illustrating the affinity of chlorine for hydrogen. How may hydrochloric acid be decomposed into its elements? Write the formulas of three metallic chlorides.

(5) Describe the natural varieties of the element carbon. Describe the more important artificial varieties. How is *Carbo Ligni* made, and what are its uses? How is *Carbo Animalis* made, and what are its uses?

(6) Complete the following reactions and state in what connection they are used:

$$MnO_2 + 4\,HCl =$$
$$2\,NH_4Cl + CaO =$$
$$NaNO_3 + H_2SO_4 =$$
$$Ca_3(PO_4)_2 + 2H_2SO_4 =$$

QUESTIONS BY EXAMINING COMMITTEE.

(1) Name five officinal drugs for which strong alcohol would be the best menstruum. Name five for which diluted alcohol would be preferred. State reasons for determining why alcohol or diluted alcohol should be used.

(2) What is the chemical formula of Hydrobromic Acid? Give the name

and strength of the officinal preparation. Give a test to distinguish between Hydriodic and Hydrobromic Acids.

(3) What is the unit of length in the Metric System? What relation has it to the circumference of the earth? State its length in inches and decimal fractions. State the equivalent in fluid ounces or pints of the unit of capacity. How is the unit of weight derived from the unit of capacity? What prefixes are used to express decimal increase of all the above units? What prefixes are used to express decimal division of all the above units? From what language are the prefixes that multiply derived? From what language are those that divide derived.

(4) What is the composition of the atmosphere? Give the proportions of its two principal constituents. Is it a chemical combination? What is its specific gravity? What does 100 cubic inches of air weigh? What pressure is exerted by the atmosphere on the surface of the earth at the level of the sea.

SPECIMENS.

Caryophyllus.	Liq. Ammonii acet.	Ammonii chlorid.
Chelidonium.	Syr. Ferri iodidi.	Zinci sulphas.
Mentha piperitha.	Tinct. Gent. comp.	Acid. boricum.
		Aqua Chlori.

OPERATIVE PHARMACY.

Granulated Salt.

Chloride of Ammonium, ... 240 gr.
Purify and granulate.

Syrup.

Fluid Extract of Ginger, ... 1 fl. dr.
Carbonate of Magnesium, ... 20 gr.
Granulated Sugar, ... 3¼ troy oz.
Water, ... 2 fl. oz.
Make Syrup of Ginger.

Mercurial Ointment.

Mercury, ... ½ oz. av.
Suet, Lard, of each, ... ¼ oz. av.
Mercurial Ointment, ... 50 gr.
Comp. Tinct. Benzoin, ... 30 drops.
Make by the officinal process.

The examination of the senior students was held at the close of March, a day being devoted to each branch.

MATERIA MEDICA AND BOTANY.

A—Ipecacuanha—Give the botanical name and habitat of the plant yielding it. Describe the manner of collecting the root. Give a full description of the physical appearance of the drug. Describe its structural characteristics. Give the percentage and some of the properties of the active alkaloid. State the distinguishing characteristics of the false ipecacuanhas occasionally met with. Give the doses of ipecacuanha as an expectorant, nauseant and emetic.

B—Geranium—Name the pharmacopœial plant and its habitat. Describe the drug, as seen in the market. Give a description of its structural characters. Name the constituents, giving the percentage of the medicinally important one. By what physical and structural marks can you distinguish the drug from

tormentil and *bistort?* From which natural orders are the three drugs derived? What is the dose of these drugs?

C—Frangula—From what plant is this drug obtained, and where is it indigenous? Describe the drug according to its physical characteristics. Explain its structural characters. How soon after collection should the drug be used, and why? Name its important principles; also its medicinal properties and dose. In what respect does an allied American drug differ from Frangula?

D—Poison Oak—To what plant is this popular name applied, and where is it indigenous? Give a complete description of the part which is medicinally employed. What proximate principles have been observed in the drug? Give some characteristic properties and reactions of the poisonous principle. How soon after collection should the drug be used and why? Name some other drugs furnished by the natural order to which the poison oak belongs.

E—Tamarind—Name the plant and its original habitat. From which country is the American market supplied. Give a description of the part of the plant used. State how this part is prepared for commerce. Describe the drug as seen in commerce. Name its constituents. Also its medicinal properties and dose. What other drugs are obtained from the same suborder of the Leguminosæ?

F—Nux vomica—Give the botanical name and the habitat of the plant yielding this drug. Describe the physical characteristics of the drug. Explain its structure, pointing out all the different layers and parts. Name the glucoside present in nux vomica. Give the total percentage of the two alkaloids and state to what extent they vary in proportion. Describe characteristic reactions of each alkaloid. Give the dose of nux vomica and of its principal alkaloid. What antidotes are used in cases of poisoning?

G—Name the *astringent extract-like drugs* of the Pharmacopœia. Give for each the botanical origin. Also the process of preparation. Describe each drug as to physical properties, solubilities and constituents. Name other similar drugs and briefly state their origin and characteristics.

H—Kamala—Give its botanical origin and the habitat of the plant. How is the drug collected? Describe its characters, including appearance under the microscope and behavior to solvents. What are its constituents and the amount of ash? How may adulterations be detected? Name the medicinal properties and dose.

I—Opium—How is the milk-juice of the poppy plant obtained and prepared for the market? How would you judge of the quality of opium without assay? Give an outline of the pharmacopœial process for morphiometric assay. State the effect of different simple solvents upon the alkaloid morphine Also some of its tests of identity. What antidotes are recommended in cases of poisoning by Opium.

K—What effect has ferric choride upon

a) tincture of opium; *b*) tincture of aloes;
c) tincture of guaiacum; *d*) oil of cloves.

How would you distinguish between drying and non-drying fatty oils?

How would you detect the following adulterations:

a) Castor Oil in Balsam of Peru;
b) Resin in Musk;
c) Starch in powdered Tragacanth.

THEORY AND PRACTICE OF PHARMACY.

A—(1) An apothecary has two kinds of opium, one 13½ per cent., the other 16 per cent.; he desires to make 8 troy ounces of 14 per cent.; how much of the weaker kind must he use?

(2) If moist opium containing 12·8 per cent. of morphine loses 20 per cent. of its weight by drying, how much morphine per cent. will it contain when dry?

(3) A druggist, having bought ten litres of oil of lemon (sp. gr. 0·8505), wished to put it up in bottles holding one ounce avoirdupois. How many bottles would be required to hold the ten litres (no allowance being made for down weight or other losses)?

B—Give the unabbreviated officinal name, the ingredients, brief outline of process, and description of the appearance of James' Powder; Fluid Extract of Foxglove; Antimonial Wine; Hive Syrup; Huxham's Tincture; Carron Oil; Bay Rum and Brown Mixture.

C—Give the English name and synonym, the ingredients, brief outline of process and description of the appearance of Collodium cum Cantharide; Syrupus Ipecacuanhæ; Unguentum Aquæ Rosæ; Tinctura Opii Deodorata; Infusum Digitalis; Liquor Potassii Arsenitis; Oleatum Hydrargyri; Pilulæ Rhei Compositæ.

D—Describe three processes for making glycerin. What are the usual impurities found in glycerin? What are the physical and medicinal properties of the best known compound produced by the action of nitric acid on glycerin? By what names is it known in commerce, medicine and the arts? How is it used in medicine? What is the dose?

E—Give the principal test of identity for quinine; salicylic acid; veratrine; wood creasote and carbolic acid.

F—Define the following substances: Pepsin; Peptone; Pancreatin, and Ptyalin.

State the properties and uses of each substance, and name some of the forms in which the first three substances are found in commerce.

G—What is meant by Chemical incompatibility; by Pharmaceutical incompatibility, and by Therapeutical incompatibility? Give an illustration of each.

H—Criticise and correct the following prescriptions, if necessary, stating what difficulties there may be in compounding and dispensing them, and how they would be remedied:

℞

Potas. Iod. gr. iij
Quin. Sulph. gr. j
Syr. Aurant. ʒss
Aquam ad ʒij
M.

℞

Mist. Digitalis Comp. fʒij
Tinct. Gentian Comp. } āā fʒi
Tinct. Cinchon. Comp. }
Morph. Sulphat. gr. x.
M. S. Two teaspoonfuls 3 times a day (in water).

℞

Liq. Ammon. Acet., fʒiv
Acidi Aceticum, fʒi
Tinct. Ferri Chloridum, fʒss
Glycerinum, fʒss
Muc. Acaciæ ad fʒviij
Sig. A teaspoonful every three hours.

I—Criticise and correct the following prescription, writing out in full Latin form the proper names of the ingredients, and write a suitable label for each; if there are any difficulties in compounding, state them:

℞

Sarah McM ——.	Tr. Rhei } āā f℥iij
Morph. S. gr. i	Tr. aloes }
Amm. Mur. ℥i	Nux Vom. f℥iiss
Mist. Fuscæ, ℥iv	Glycerin, f℥i
M. S. ℥ij, in cough.	Ac. Nitrous, f℥i
	Aqua q. s. ft. f℥iv

K—Write out a prescription for a pint of 50 per cent. Emulsion of Cod Liver Oil, and describe the best process for emulsifying it.

Write out a metric prescription for one hundred pills, each to contain $\frac{1}{20}$ gr. of arsenious acid, 2 grains of sulphate of quinine, with 3 grains of iron by hydrogen, and state the proper excipients.

CHEMISTRY.

A—Describe the metal Sodium. State how it is obtained, giving any recent improvements in methods. What are the uses of the metal? Give the general tests for Sodium compounds.

B—What are the native sources of Borax? Give the chemical formulas for *Sodii Boras* and for *Acidum Boricum*. How would you prepare Boric Acid from Borax? Give the most characteristic tests for both Borax and Boric Acid.

C—What is the composition of "White Lead," what of "Red Lead," what of "Sugar of Lead?" By what simple tests can you establish the chemical nature of each of these compounds? Give the several manufacturing processes followed for the preparation of White Lead. What is the chemical composition of Goulard's solution and how is it made?

D—Mention the important alloys of Copper, stating what the components are in each case. Do the same with the alloys of Lead. What is the composition of "Fusible Metal," and what are its properties and uses?

E—What is "White Arsenic?" What are the chief ores of Arsenic and how is White Arsenic made from them? How does Ferric Hydrate act as an antidote when administered in Arsenic poisoning cases? Mention the most important tests for Arsenic in cases of suspected poisoning by this metal.

F—Give the chemical formula for *Chloroformum*, and state to what class of compounds it belongs. From what materials is it made and by what process? Give the chemical formula for *chloral* and state to what class of compounds it belongs and how it is made. What is Paraldehyde and how is it made?

G—What are Ferments and what several classes of decompositions do they bring about? Enumerate the industries based upon fermentation changes. Give the chemical reactions for the more important of these changes.

H—Give the chemical formulas of Valerianic acid and Oleic acid and of an officinal compound of each. Give the formulas of Tartaric acid and Citric acid respectively and state how you would distinguish them by both physical and chemical tests. Give the formulas of two officinal tartrates and two officinal citrates.

I—Give the formula and state the several natural and artificial sources of

Benzoic acid. Compare the graphic formulas of *Acidum Benzoicum, Acidum Salicylicum* and *Acidum Gallicum*. Give the graphic formulas of Naphthalene, of α-Naphthol, of β-Naphthol.

K—What are essential oils, and in what physical and chemical characters do they differ from the fixed oils? In what several groups may they be divided? What are the compounds which are formed by the oxidation of the essential oils? Give a classification of these latter compounds.

EXAMINATION BY THE COMMITTEE.

A—What officinal substances are termed Balsams? Give natural order; origin; method of collection. Describe their appearance in commerce. What constituents are common to Balsams? What adulterations are usually found in them? Name two officinal substances which are closely allied to Balsams in chemical constituents and physical properties.

B—What is a Hydrocarbon? How do Hydrocarbons differ chemically from Carbohydrates? What two Halogen derivatives of hydrocarbons are officinal? Give symbolic formula of officinal Alcohol. How many strengths of alcohol are officinal? Give specific gravity of each. Give the symbolic formula of Ethyl oxide. Give the unabbreviated officinal names of the two varieties of Ether. State the respective percentages of alcohol and ethyl oxide contained in each. Give the specific gravities of the officinal ethers at 15·6° C. What is the difference, chemically, between Petroleum-benzin and Benzol?

C—In what respect does the Alumen of the U. S. Pharmacopœia of 1880 differ from the Alumen of the U. S. Pharmacopœia of 1870? Give a chemical test to distinguish one from the other. How may the presence of iron be detected in alumen? Explain the clarification of turbid water by the addition of a small quantity of alumen. How is Alumen exsiccatum made? How does it differ from alumen? Give the name and properties of the metal contained in the compounds of the alumen.

D—Give the officinal name of the Oil of Wintergreen. Give the botanical name of the plant yielding it. From what other plant is much of the oil of wintergreen of commerce obtained? Do these two oils differ greatly in properties and composition? Give the specific gravity of the oil of wintergreen. Of what chemical compound does it largely consist? What officinal acid may be prepared from it? How may adulterations with alcohol and chloroform be detected? How may the absence of Oil of Sassafras be shown? Into what officinal preparations does oil of wintergreen enter.

E—Name three characteristic tests for Lead? What acids are used to dissolve metallic lead? Give two tests to distinguish the Salts of Copper and Bismuth. What three tests are used to distinguish between Sulphites and Thiosulphates?

F—Give the officinal preparations of Colchicum Root and Colchicum Seed. State the strength of each preparation; the menstruum used; the dose you would give of each. Describe the best process for exhausting Colchicum seed. Name the active principle. Give a test to establish its identity.

G—A flask, holding a litre, is half full of water, and an equal bulk of another officinal liquid being added, the contents weigh 1,125 grammes; what is the liquid, and what is its specific gravity?

H—What will be the appearance of the following prescriptions when com-

pounded? Would you dispense them as written? If so, how? If not, what admissible additions would be proper?

℞

Ferri et Pot. Tart. ʒss
Potassii Bromid., ʒij
Syr. Limonis, fʒiv
Aquæ ad fʒiij
M. Ft. Solutio.

℞

Collodii,
Tinct. Iodi, } āā fʒij
Aquæ Ammon.
M. Sec. art.
Sig. Use with a brush.

℞

Menthol, ʒss
Chloral Hydrat. gr. xxiv
M. et div. in chart. No. vi
S. Put one powder in a gill of hot water and use as directed.

I—Criticise the following prescription, translate it, writing out the English names in full:

℞

Morph. Acet. gr. ¼
P. Colch. gr. iij
Ft. Pil. 4 tis. horis. sum.
Mitte VI. in fol. arg. inv.

Would you dispense this as written? If not, what would be your method of procedure?

℞

Quin. Sulph. gr. i
Morph. Sulph. gr. viij
Ft. pil. No. viij
Sig. One pill every 3 hours.

Is it proper to dispense the following prescription? Criticise it.

℞

Res. Podoph. ʒi
Pulv. Aloes,
Pulv. Ipecac. } āā gr. xlv
Ext. Tarax.
Spt. Ol. Menth. Pip. ʒss
Liq. Potass. q. s.
Ft. pil. No. xxx.
Sig. Two at night.

K—Criticise the two following prescriptions: State whether you would compound them. Are any of the ingredients incompatible? If so, which are? State what action takes place, if any.

℞

Plumbi Acet. gr. xxiv
Acid. Sulph. Arom., fʒij
Tinct. Kino, } āā fʒiss
Tinct. Kramer.
Tinct Cinchon. Comp. q.s. ft. fʒiv
M. Ft. Solutio.

℞

Acid. Nitric. fʒiv
Acid. Carbolic, fʒvi
M. Apply as directed.

Criticise this prescription; write out a new prescription, correcting any

mistakes that you observe in this one; give the correct language, terminations, and quantities for a cough mixture with these ingredients:

℞

Codeine Sulphas, 2 gm.
Ac. Hydrocyanic, 8 cc.
Tr. Bellad. 30 cc.
Ext. Ipecac. Fl. iv cc.
Syr. Scillum, 30 cc.
Aqua Mint, q. s. ft. ad 120 cc.
Mix.
Sig. Two teaspoonfuls every 2 hours.

SPECIMENS.

Materia Medica.	*Pharmacy.*	*Chemistry.*	*Committee.*
Gelsemium.	Aqua Amygd. amara.	Acid. Boricum.	Calumba.
Cypripedium.	Glycerinum.	Potass. bicarb.	Mezereum.
Scilla.	Alcohol.	Potass. chloras.	Bals. Peruvian.
Azedarach.	Spir. Juniperi comp.	Sodii hyposulph.	Pulv. aromat.
Eucalyptus.	Spir. Ætheris comp.	Sodii acetas.	Tinct. Serpentariæ.
Sambucus.	Elixir Aurantii.	Ammon. chlorid.	Extr. Eucalyp. fl.
Coriandrum.	Ol. Terebinthinæ.	Magnes. sulph.	Syrup. Rhei.
Pepo.	Syr. Aurantii flor.	Zinci acetas.	Spir. Chloroformi.
Ergota.	Acid. Acetic. dilut.	Æther.	Potass. nitras.
Resina.	Liq. Sodæ chlorat.	Chloroformum.	Sodii bicarb.

OPERATIVE PHARMACY.

Suppositories.

Sodium Carbonate, ... 5 gr.
Stearic Acid, ... 10 gr.
Glycerin, ... 2 fl. dr.
Make six Suppositories.

Bacilli.

Powd. Extract of Liquorice, ... 100 gr.
Powd. Acacia, ... 15 gr.
Powd. Sugar, ... 60 gr.
Syrup of Tolu, ... q. s.
Make 18 bacilli.

Ointment.

Mercury, ... 37 gr.
Nitric Acid, ... ¼ fl. dr.
Lard Oil, ... 1 fl. oz.
Nitric Acid, ... ½ fl. dr.
Make Citrine Ointment by the officinal process.

Mixture.

Potass. Chlor. Pulv. } . . . . . āā gr. xx.
Sodii Chlor. }
Acid. Hydrochlor., ... fl ʒi.
Aquæ, ... q. s. ad fl ℥ij.
Fiat mistura, sec. art.

Plaster.

Spread a Burgundy Pitch Plaster, 4 x 6.

ANALYTICAL CHEMISTRY.

The qualitative determination of inorganic bases, and of inorganic and organic acids was required, the chemicals or mixtures being presented in powder.

Of the seventeen candidates, who had attained the grade "very satisfactory" in the examination of pharmacopœial crude drugs and in descriptive materia medica, twelve participated in the examinations for the J. M. Maisch prize, offered by Mr. J. H. Redsecker, of Lebanon, Pa., and for the prize offered by Mr. J. H. Stein, of Reading, Pa., the examinations being held April 13. In the former case, the microscopical specimens consisted of a longitudinal section of the frond of Aspidium, the cuticle of the leaf of Agave, and the transverse section of the stem of Parthenium, for the determination of the classes of plants and of the plant organs; also of sections of the following drugs for recognition: flax seed, anise fruit, juniper berries, and the roots of Sarsaparilla, Ipecacuanha, Stillingia and Apocynum cannabinum.

Of these specimens anise, apocynum, ipecacuanha and sarsaparilla were recognized each by ten candidates, while the remaining specimens were determined by a smaller number.

The other set of specimens consisted of samples of drugs occasionally met with in commerce, the character of which was to be determined with no other aid except a simple lens; the collection comprised Senega adulterated with the roots of Gentiana Catesbæi; Chicory root, cut; branches of mealy Belladonna root, longitudinally sliced before drying; Moravian Rhubarb; Psychotria emetica (offered as a substitute for ipecacuanha); Phlox carolina (substitute for spigelia); leaves of Chimaphila maculata; berries of Rhamnus catharticus and Cubeb, mixed; Anise mixed with Conium fruit, and Crocus adulterated with dried Calendula. All these drugs and adulterations were determined with the exception of the roots of blue gentian contaminating the sample of senega.

The names of the successful candidates for the degree of Graduate in Pharmacy (Ph.G.), including several having passed in the preceding year, but completed their term of service since then, are contained in the following list, which gives also the titles of the theses presented by the candidates:

Charles Frederick Alsentzer, Delaware, Proprietary Medicines.
Thomas Jennings Baker, Pennsylvania, Koumys.
Mortimer H. Baskin, Pennsylvania, Syrupus Benzoini.
Robert Wilbert Beck, Pennsylvania, Salix lucida.
James Ferris Belt, Delaware, Glycerin.
Edward Augustus Bender, Pennsylvania, Citrate of Magnesium.
John J. Bender, Pennsylvania, Peroxide of Hydrogen.
A. Stewart Besore, Pennsylvania, Acidum Sulphuricum Dilutum.
Joseph Brown Bilderback, New Jersey, Syrupus Benzoini Compositus.
Harry Bitler, Pennsylvania, Dilute Hydrobromic Acid.
Russel Thorn Blackwood, Pennsylvania, Progress in Pharmacy.
George McLeod Bowman, D. C., Natural order Rubiaceæ.
Albert Lewis Boush, Pennsylvania, Tinctures, Solid and Fluid Extracts.
Allen Webster Boyer, Pennsylvania, Phenacetin.

Franklin Nagle Boyer, Pennsylvania, Grindelia robusta.
Col. Jas. Clarkson Boyles, Pennsylvania, Liquor Plumbi Subacetatis.
William H. Breisch, Pennsylvania, Oil of Birch.
Otto Carl Bresser, Pennsylvania, Preparation of Syrups.
William Oscar Brice, S. Carolina, Tendencies in Pharmacy.
William George Bridgman, England, An Old Page of Medical History.
Harry H. Bright, Pennsylvania, Sabbath Observance.
Frank Luther Brown, Pennsylvania, Mercuric Oxide.
John Armstrong Buckner, Missouri, Ceanothus americanus.
William Beatty Bunker, Ohio, Hydrastis canadensis.
Arch Webster Burdick, Pennsylvania, Unguentum Aquæ Rosæ.
Francis James Butterworth, Pennsylvania, Syrups.
Alfred Sylvester Butz, Pennsylvania, Observation in Pharmacy.
*William James Carey, Pennsylvania, Alcohol.
William Asbury Carpenter, Delaware, Benzoic Acid.
Benson Grant Clapham, Pennsylvania, Acetic Acid.
John Halliday Cline, Pennsylvania, Cimicifuga.
William Arthur Clingan, Iowa, Tinctura Ferri Chloridi.
Levi Bennett Cochrane, New York, Pharmacy and its relations to society.
Herbert Cooper, Delaware, Preparation of Tinctures.
Frank Henry Cope, Pennsylvania, Petrolatum.
John Richard Costin, Maryland, Amylum Iodatum.
T. S. McNeilley Cunningham, Tennessee, Tannic Acid.
David Dalton, Pennsylvania, Oleates.
Edward Davis, Pennsylvania, Stramonium.
Jacob Highley Dewees, Pennsylvania, Cardamoms.
Charles B. Dierolf, Pennsylvania, To Prepare Emulsions.
Thomas Henry Dillon, Jr., Pennsylvania, Cocaine and its Salts.
Robert Lovine Dubbs, Pennsylvania, Parasites.
Edwin Stanton Eby, Pennsylvania, Emulsions.
Charles Alfred Eckles, Pennsylvania, The Antipyretics.
Walter Rowland Elliot, Pennsylvania, Menthol.
Jacob Mauger Faust, Pennsylvania, Petrolatum.
Edward Shoener Fernsler, Pennsylvania, Standardization.
John Henry Fies, Pennsylvania, Carbon.
Thomas Milton Fletcher, Arkansas, Asimina triloba.
Richard Deily Fraunfelder, Pennsylvania, Ipecacuanha.
Adelbert Porter French, Pennsylvania, Potassii bitartras.
Francis Freas French, Pennsylvania, Syrup of Benzoin.
Harry Edmund Fry, Pennsylvania, Antipyrine and Antifebrin.
Alfred Ball Garges, Ohio, Indian Hemp.
John Kistler Garland, Pennsylvania, Tinctura Cinchonæ Composita.
Frank Christian Gerlach, Ohio, Ceanothus americanus.
David Clarence Gibbony, Iowa, Natural Salicylic Acid.
Robert Glenk, Pennsylvania, Cicuta maculata.
Benjamin Mylin Good, Pennsylvania, Glucose.
Miss Jean Gordon, Ohio, Extract of Malt.
Benjamin Harvey Gorrell, Jr., Virginia, Polygonatum biflorum.
William Edgar Gosh, Pennsylvania, Syrupus Benzoini.

*Died before Commencement.

Christian Gruhler, Pennsylvania, Glycerin Suppositories.
William Henry Haake, Ohio, Cotula.
G. Washington Hackenberger, Pennsylvania, Glycerin Suppositories.
George Wyly Hackney, Pennsylvania, Thoughts on Pharmacy.
William Henry Hague, Ohio, Hedeoma.
Charles Edward Hammerquist, New York, Fluid Extract of Turkey corn.
William Tabor Hankey, Wisconsin, Sabbatia angularis.
Arthur Edward Hanson, South America, Manihots.
Frank Gast Hartman, Pennsylvania, Volatile Oils.
Henry Decora Hasson, Pennsylvania, Opium.
William Smith Heiges, Pennsylvania, Avena sativa.
Luther Samuel Henkel, Pennsylvania, Erythroxylon Coca.
Conrad John A. St. Herber, Indiana, Phosphoric Acid.
Jacob Hoch, Pennsylvania, Celastrus scandens.
Theodore Albert Hohman, West Virginia, Compressed Tablets.
Edwin Austin Horn, Pennsylvania, Manaca.
John Wallace Hough, Pennsylvania, Aqua Ammoniæ.
Charles Marcus Hudson, Maryland, Standardization.
Adam Rankin Johnson, Kentucky, Mistura Chloralis.
William Hewitt Jones, Pennsylvania, Pilocarpus pennatifolius.
Edward Francis Kessler, Ohio, Eupatorium.
James Elihu Keyes, New York, Spongia.
Grantham Arthur Kinsel, Pennsylvania, Natural Gas.
Charles E. Kitchen, Ohio, Fabiana Imbricata.
William George Kleinstuber, Delaware, Calx Sulphurata.
George Alexander Knowles, Pennsylvania, Carica Papaya.
Louis Homer Koch, Ohio, Taraxacum Officinale.
Paul Krebs, Ohio, Polygonum Bistorta.
William Austin Kulp, Pennsylvania, Pharmacist and Physician.
Edgar La Place, Connecticut, Cantharides.
Edward Lehman, Tennessee, Poison and Poisoning.
Frank Irwin Leinbach, Pennsylvania, Piscidia Erythrina.
Jonathan Knight Lippen, New Jersey, Rubus Villosus.
Alexander George Loelkes, Illinois, Ceanothus americanus.
Christian Leitner Long, Pennsylvania, Analysis of water.
Herman Ernst Lupus, New Jersey, Commercial Teas.
Irwin Breneman Lutz, Pennsylvania, Castanea.
William Dellet Lutz, Pennsylvania, Cochineal.
Frank Floyd Lyons, Ohio, Sambucus Canadensis.
Linwood Dunham McClure, Pennsylvania, Successful Pharmacists.
Philip Celestine McLaughlin, Pennsylvania, Petroleum.
W. Feinour MacLennan, Pennsylvania, Cola acuminata.
Henry Steely McNabb, Pennsylvania, Cola nuts.
Clinton Eugene Main, Maryland, Acidum Sulphurosum.
Fred. Augustus Manter, North Carolina, Borate of Cocaine.
William Arnold Markley, Pennsylvania, Salicylic Acid.
Joseph Howard Marvill, Pennsylvania, Milk Analysis.
Harry Carleton Mendenhall, Pennsylvania, Nitric Acid.
Quillas Alfred Meyer, Pennsylvania, Concerning Syrups.
Frank Miller, Pennsylvania, Acidum Aceticum Dilutum.

William Edward Miller, New Jersey, Pepo.
William Haman Miller, Delaware, Materia Medica.
James Johnson Moore, Pennsylvania, Aristol.
Guadalupe Morales, Nicaragua, Dialysis.
Ellwood George Nickum, Pennsylvania, Lanolin.
Charles Sheppard Ogden, New Jersey, Amylum Iodatum.
Josiah Comegys Peacock, Maryland, Oil of Aristolochia reticulata.
John Flemming Pentz, Pennsylvania, Pepsin.
Joseph Conrad Perry, Pennsylvania, Chian Turpentine.
Alexander Bain Petrie, Jr., Ontario, Hydrochloric Acid.
William Pfeuffer, Texas, Balmony.
Lehman Blew Phillips, New Jersey, Physostigma.
Charles Torbert Pickett, Pennsylvania, Olive Oil.
George Fisk Platt, Pennsylvania, Areca.
Wm. Henry Pratt, New Jersey, Life of a Druggist.
B. Alfred Randolph, Texas, Magnolia grandiflora.
Frederick Miller D. Raub, Pennsylvania, Æsthetics in Preparations.
Charles Hunter Raudenbush, Pennsylvania, Liquor Ferri Chloridi.
Albert George Reizenstein, Pennsylvania, Extractum Glycyrrhizæ fluidum
Charles Alexander Ridgway, Pennsylvania, Glechoma.
Samuel Jacob Riegel, Pennsylvania, Zingiber.
Arthur Raymond Rolleston, Pennsylvania, Grindelia robusta.
Henry Fry Ruhl, Pennsylvania, Repercolation.
Milton Franklin Schaak, Pennsylvania, Populus.
Franklin Benjamin Scheirer, Pennsylvania, Zinc.
Laurence Oliphant Schetky, New Jersey, Spiritus Ammoniæ Aromaticus.
Justus Schmidt, Ohio, Medicated Waters.
Allen Beecher Schminky, Pennsylvania, Syrupus Guaiaci.
Robert Burns Scott, Pennsylvania, Rock Candy Syrup.
Charles Jacob Seltzer, Pennsylvania, Hydrogen Peroxide.
Carl Whittaker Shull, New Jersey, Triturations.
Calvin Bruce Shuman, Pennsylvania, Cetaceum.
Wesley Cline Sitgreaves, New Jersey, Precipitated Chalk.
Benjamin Franklin Smith, Pennsylvania, Estimation of Morphine.
Charles Adam Smith, Pennsylvania, Latent Heat.
Harry Allen Smith, Pennsylvania, Mistura Ferri et Ammoniæ Acetatis.
Herbert Johnson Smith, Maryland, Tinctura Opii.
Edward Thomas Spencer, Pennsylvania, Tablet Triturates.
Elmer Spragle, Pennsylvania, Oleum Theobroma.
James Harvey Spruance, Delaware, Opium.
Lee Steinau, Louisiana, Phlox subulata.
Ephraim Henry Steiner, Pennsylvania, Pharmaceutic Success.
Walter Stimmel, Delaware, Salts of Oxyhydrolapachic Acid.
Louis Franklin Stoffregen, Pennsylvania, Balsamum Tolutanum.
Oliver Stout, Pennsylvania, Emulsion of Cod Liver Oil.
William Alvah Strode, New York, Scientific Pharmacy Applied.
John Geary Stroud, Pennsylvania, Pharmacy as a Profession.
Theodore Herman Strouse, Pennsylvania, Ferula Sumbul.
Harry C. Swartley, Pennsylvania, Ointments.
Joseph Henry Sweeney, Minnesota, Doctors as Pharmacists.

Chas. Leonard Thompson, Delaware, Pilular Extracts.
Maxwell Gustav Tielke, Ohio, Calendula officinalis.
John Fine Tinsman, Pennsylvania, Erythroxylon.
Joseph Harry Venn, Tennessee, Comptonia.
Samuel Albert Visanska, South Carolina, Substitutions in Pharmacy.
Robert Toomer Ward, Alabama, Tincture of Iodine.
Frank Charles Weber, Pennsylvania, Principles for a Successful Pharmacy.
Geary Augustus Weston, Pennsylvania, Acidum Nitricum Dilutum.
Oscar Kellogg Whipple, New Jersey, Ferri oxidum hydratum.
George Nixon Whitaker, New Jersey, Contention of a Pharmacist.
Frank Willett White, Kansas, Gillenia trifoliata.
John Henry Williams, Pennsylvania, Neatness in prescriptions.
Harry Wisler Zeamer, Pennsylvania, Estimation of Chlorine in Liquor Sodæ Chloratæ.
John Paul Zeller, Pennsylvania, Opium.
Albert August Zulich, Pennsylvania, Rhamnus Purshiana.

Summary of the members of the graduating class: 110 come from Pennsylvania; 13 from Ohio; 12 from New Jersey; 10 from Delaware; 5 from Maryland; 4 from New York; 3 from Tennessee; 2 each from Iowa, Kentucky, South Carolina and Texas; and one each from Alabama, Arkansas, Connecticut, District of Columbia, England, Georgia, Illinois, Indiana, Kansas, Louisiana, Missouri, Minnesota, Nicaragua, North Carolina, Ontario, South America, Virginia, West Virginia, Wisconsin; total number, 184.

The professors invited the graduating class, also the officers and trustees of the College to a reunion on Tuesday, April 21, supper being served in the museum of the College, where a few hours were spent in pleasant intercourse.

The Commencement took place at the Academy of Music on the evening of Wednesday, April 22, when President Charles Bullock conferred the degree of Graduate in Pharmacy upon the above-named candidates. The honorary degree of Master in Pharmacy was conferred on James T. Shinn, Ph.G., and Prof. Henry Trimble, Ph.G. Subsequently a Certificate of Proficiency in Chemistry was bestowed upon:

Julius Leopold Baldauf, Ph.G., Kentucky:
Louis Michael Carriat, Pennsylvania.
Richard Gaillard Dunwody, Ph.G., Georgia.
Charles Albert Waterall, Pennsylvania.

The following graduates were awarded honorable mention with the grade of "distinguished:" R. Glenk, J. Gordon, W. T. Hankey, F. F. Lyons, C. E. Main, W. R. Pfeuffer; with the grade "meritorious:" R. W. Beck, E. C. McGregor, G. Morales, J. C. Peacock, C. B. Shuman, M. G. Tielke, J. H. Venn, F. W. White. The Henry C. Lea prize, $100, for the most meritorious researches recorded in the graduation dissertation was bestowed upon J. C. Peacock, with honorable mention of R. Glenk and W. T. Hankey. M. F. Schaak was the recipient of the Materia Medica prize, a Zentmayer microscope, offered by Professor Maisch, for original histological work on an American plant. The Pharmacy prize, a gold medal, offered by Professor Remington for original pharmaceutical work was awarded to R. W. Beck, honorable mention being due to H. L. Boggs, F. H. Cope, W. T. England and T. A. Hohman. The Chemistry prize, a chemical balance, for original quantitative analysis, was earned by F. C. Gerlach, honorable mention being made of J. C. Peacock and W. T.

Hankey. The Analytical Chemistry prize of $25, offered by Prof. Trimble for original chemical work not connected with the thesis, was presented to J. C. Peacock, with honorable mention of W. T. Hankey. The J. M. Maisch prize of $20 in gold, offered by W. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was carried off by F. F. Lyons, and the prize of $20 in gold, offered by M. J. H. Stein, of Reading, Pa., for proficiency in determining the character of crude drugs, by R. Glenk, honorable mention being due, in connection with these two prizes, to J. R. Costin, J. Gordon, W. H. Hague, W. T. Hankey, G. A. Kinsel, W. G. Kleinstuber, G. A. Knowles, A. Loelkes, C. E. Main, G. Morales, J. C. Peacock, W. R. Pfeuffer, C. B. Shuman and J. H. Venn. The Operative Pharmacy prize of $25 in gold, offered by Mr. E. L. Boggs, of Charleston, W. Va., was presented to F. W. White with honorable mention of C. J. C. Boyles, A. S. Butz, T. S. M. Cunningham, R. Glenk, J. W. Hough, G. Morales, A. B. Petrie, Jr., and C. H. Raudenbush. The Theoretical Pharmacy prize, a prescription balance, offered by Mr. H. J. Maris, of Philadelphia, for the best examination in theoretical pharmacy, was carried off by J. C. Peacock, and honorable mention was accorded to J. K. Garland, R. Glenk, J. Gordon, W. T. Hankey, F. F. Lyons, W. R. Pfeuffer, L. B. Phillips, C. B. Shuman, M. G. Tielke, J. H. Venn and O. K. Whipple. The Robinson Chemical prize, consisting of a gold medal and certificate, offered by Mr. J. S. Robinson, of Memphis, Tenn., for the best examination in general and analytical chemistry was presented to W. T. Hankey.

The valedictory address to the graduating class, replete with sound advice to the young pharmacists, was delivered by Professor Sadtler. The ceremonies were interspersed with music, and closed with the distribution of the presents sent to individual graduates by their friends.

The Alumni Association of the Philadelphia College of Pharmacy tendered its 27th annual reception to the graduating class on the evening of April 20, at Association Hall. The exercises consisted of music by the Philadelphia Zither Quartette; an address by President W. Nelson Stem, Ph. G.; the presentation of the Alumni certificate of membership; the awarding of prizes; the class oration by H. C. Swartley, of Pennsylvania; a discourse on the history of the class by F. W. White, of Kansas, and on the future of its members by C. H. Raudenbush of Pennsylvania; the awarding of microscopy certification; recitation of the class poem, by E. Spragle, and of a histrionic act, entitled The Shamrock Ph. G. (?) of the P. C. P. The prizes awarded for best examinations, were as follows: General examination, the Alumni gold metal to F. F. Lyons; and certificates, viz: Materia Medica, R. Glenk; Pharmacy, J. C. Peacock; Chemistry, J. Venn; Specimens, Miss J. Gordon; General Pharmacy, H. F. Ruhl; Analytical Chemistry, C. A. Ridgeway; and Operative Pharmacy F. W. White; also for junior examination, A. W. Dowd of Nebraska.

The Albany College of Pharmacy held its commencement on the evening of March 10, when 24 candidates received the degree of Ph.G.

The Buffalo College of Pharmacy, at its annual commencement held March 24, had 12 graduates.

The Chicago College of Pharmacy held the commencement exercises of its thirtieth session, at the Grand Opera House, on March 10, when President Forsyth conferred the degree of graduate in Pharmacy upon 24 candidates.

The Cincinnati College of Pharmacy held its annual meeting February 15.

The name of Prof. J. F. Judge was placed upon the roll of honorary members, and the following officers were elected: President, H. Wrede; Vice-President, Geo. Eger; Recording Secretary, A. Meininger; Treasurer, C. Fennell; and Corresponding Secretary, W. Simonson.

The Illinois College of Pharmacy held its commencement terminating the winter course, February 24, at the Grand Opera House, Chicago, when 29 candidates received the degree of Graduate in Pharmacy.

The Maryland College of Pharmacy celebrated the fiftieth anniversary of its organization on Friday, April 17. At noon of the same day, the 39th annual commencement was held at the Academy of Music, Baltimore, when thirty candidates were graduated, and gold medals were awarded to Chas. C. Plitt (2), Chas. J. Dickinson, Thos. F. Bradenbaugh, Jas. C. Todd and Harry C. Hyde; and the junior gold medal to Harry C. Hyde. Addresses were made by Prof. Culbreth and by Rev. F. M. Ellis, D.D. In the afternoon a reception was held at the College building on Aisquith Street, and the evening was devoted to a banquet at the Eutaw House, on which occasion, besides the members and graduates of the colleges, the Mayor of the city, prominent members of the medical profession and professors of medical colleges, of the Johns Hopkins University, of the Philadelphia College of Pharmacy and the National College of Pharmacy, also representatives of the Pharmaceutical press were present. The festive table was presided over by President Louis Dohme, and toasts were offered and speeches made by a number of those present.

The Pittsburgh College of Pharmacy, at its recent annual commencement, had eight graduates.

The St. Louis College of Pharmacy had its annual commencement at Memorial Hall, March 26, when forty candidates graduated, of whom the following received prizes: The Alumni Gold Medal, Martin L. Holloway; College Silver Medal, Leo J. Beeli; Prize in Pharmacognosy, Martin L. Holloway; Theoretical Pharmacy, Leo J. Beeli; Practical, Martin L. Holloway; Microscopy, Robert E. Schlueter; Chemistry, Joseph P. Conklin. The Alumni and college prizes for Juniors was awarded to Henry J. Bass. Addresses were delivered by President Sennewald, Professor Whelpley, Professor Good, G. H. J. Andreas, Ph.G., and the valedictory on behalf of the class by Martin L. Holloway, Ph.G. We are pleased to learn that the prospects are quite favorable for the college soon being in possession of its own home.

At the annual meeting, held March 30, the following officers were elected: President, H. E. Hoelke; vice-president, E. P. Walsh; treasurer, S. Boehm; secretary, Dr. J. C. Falk; corresponding secretary, G. H. Chas. Klie. The constitution was amended making the initiation fee five dollars, the annual dues two dollars and life-membership fifty dollars. The board of trustees elected Henry Braun, chairman.

Guaiac resin possesses valuable laxative effects, according to the observations of Dr. Murrell (*Med. Press and Circular*). He has employed it in the form of lozenges prepared with black currant paste, or as a confection containing 10 grains of the resin to one dram of honey; of the latter preparation one or two drams are given three times daily.